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AUTHOR	Reuter, Jeanette; And Others
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ABSTRACT

Of the 15 substantive papers in this report, 12 focus on the use of the Kent Infant Development (KID) Scale with severely handicapped children. The KID Scale measures 252 behaviors usually developed during the first year of life in five domains (cognitive, motor, language, self-help, and social). It was successfully adapted to elicit reliable developmental information from mothers, teachers, nurses, therapists, and child care workers of 125 severely handicapped children. One paper describes studies (interjudge and test-retest) that examined the reliability of the scale, and focused on items that elicited agreement between two caregivers and those that failed to elicit such agreement in each domain. A further report describes studies that examined the scale's concurrent validity with the Bayley Scales of Infant Development and indicated (1) that high intercorrelations existed between the two measures and (2) that KID Scale developmental age estimates varied somewhat depending on the informant's relationship with the child. Additional analysis of the two measures supported findings noting similarity between developmental sequences of normal infants and severely handicapped children. A report on followup studies on KID scale results is followed by a summary of consultant and caregiver evaluations on the use of the KID scale with severely handicapped young children. The application of a sorting system based on KID Scale data to the formation of individualized program plans is addressed. The Kent Scoring Adaptation of the Bayley scales of Infant Development for assessing severely handicapped children is proposed. Three concluding studies address the following topics: the reliability and validity of the Minnesota Child Development Inventory for assessing moderately handicapped primary students; the use of the McCarthy Scales of Children's Abilities to assess mentally retarded children; and consultant and caregiver evaluations of the Minnesota Child Development Inventory. An outline of dissemination activities by project contributors concludes the report. (CL)

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Kent State University
Kent, Ohio 44242
Department of Psychology
(216) 672-2166

First Chance Project/Research

October 1, 1982

To: George Wagner
Department of Education
Office of Procurement
and Assistance Management
400 Maryland Avenue, S.W.
ROB-3, Room 5715
Washington, D.C. 20202

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From: Jeanette Reuter, Ph.D.
Principal Investigator
Professor of Psychology
Kent State University

Re: Introduction to Final Report
Grant Number: G008001794
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The final report of the Research grant entitled the Use of Caregiver Information to Design Habilitation Programs for Severely and Profoundly Handicapped Young Children of the First Chance Project of Kent State University is contained herein. All of the studies planned in our grant proposal timetable have been completed and follow with one exception. That exception is the promised revision of the KID Scale for use with severely handicapped children. The design and publication of that revision are underway. It will, of course, be based on the studies in the final report which describe the first year of research. Since we have just finished these studies, we need some more time to digest them.

EC 170030

The dissemination, application and publication of our work on caregiver assessments of handicapped young children continues. These activities are carried out by a corporation called Kent Developmental Metrics which has offices at 126 West College Avenue, Kent, Ohio 44240. The telephone number is (216) 678-3589.

The functions of the corporation are to publish the Kent Infant Development Scale (KID Scale), the Kent Adaptation of the Bayley Scales of Infant Development and a video tape on the psychological assessment of severely handicapped young children. Computer scoring for prescriptive purposes are offered for the KID Scale and the Minnesota Child Development Inventory (MCDI). We continue to offer outreach training presentations on the general topics of handicapped young children, their families and their assessment. We have contracts with a number of intermediate care facilities for severely handicapped young children as well as with a regional neonatal intensive care unit for assessment services. Parent and agency clinical consultations are available.

During the years of our federal grants we have managed to accumulate some large data pools relating to healthy infants, high risk infants and young severely or moderately handicapped children as well as the soft ware to handle data in our own KIDSMASTER system. We have just begun to exploit that data for research purposes and are continuing to plan, analyze and write up additional related studies. It is hoped that the clinical,consulting,and publication activities of Kent Developmental Metrics will sustain our continuing research effort.

The copies of research studies listed in the table of contents have been written up for publication in appropriate journals and that publication effort is continuing. By January 1, 1983, three M.A. theses and a Ph.D. dissertation will have been completed out of the First Chance Project. At the Ninth Annual TASH Meeting in Denver(in November,1982) of The Association for the Severely Handicapped, four of the project personnel will present a symposium entitled:

> "Caregiver reports for the assessment of severely handicapped young children: Reliability, validity and utility."

The abstract for the symposium is appended. Kent State University, Kent Developmental Metrics, and the participants themselves are paying the travel expenses for the trip to Denver, Colorado.

The table of contents which follows lists the studies completed and their titles. There is a blue title page preceding each study. Some of the studies have been submitted for publication, alone or in combination with others, but none are as yet in press.

Abstract for the Ninth Annual Tash Conference

Panel

Caregiver reports for the assessment of severely handicapped young children: Reliability, validity and utility

Chairperson's Abstract Jeanette Reuter

Caregivers' information about the developmental status of severely handicapped children has been the object of study of a two year research grant to the First Chance Project-Research at Kent State University by the Office of Special Education. This panel presentation is the first complete report on the results of an assessment study whose goals were to demonstrate the reliability, validity and utility of caregivers' reports on the behavioral competencies of severely handicapped children.

During the first year, the Kent Infant Development Scale was successfully adapted to elicit reliable developmental information from the Mothers, teachers, nurses, therapists and child care workers of 125 severely handicapped children. To test the validity of that information, it was compared to the developmental information provided by the Bayley Scales of Infant Development on each child. Computer based procedures for interpreting the KID Scales led to their application in the design of individual habilitation programs and for following the developmental progress of each research child.

The feasibility of extending this model for using caregiver information to design and evaluate habilitation programs for older severely handicapped children was determined by studying the results of the Minnesota Child Development Scales filled out by the mothers and teachers of moderately retarded children aged five to ten years. The reliability and validity of the developmental observations of caregivers were satisfactory when tested against the Stanford Binet and the McCarthy Scales of Children's Abilities.

The advantages of using caregiver information in the developmental assessment of children relates to both the cost efficiency of the data collection and the benefits of having the caregivers who must carry out the developmental programming involved at the earliest possible moment. If the caregiver information is not reliable and valid, the advantages to be gained are few. The results of our research reveal that this is not the case and point out how and under what circumstances caregiver information can be useful.

Participant Abstract 1 Virginia Dunn

The reliability and validity of the Kent Infant Development Scale

Several studies were conducted to determine the psychometric properties of the caregiver completed Kent Infant Development Scale (KIDS) for assessing severely handicapped young children. Samples were drawn from a data pool of 121 severely handicapped young children all of whom had two caregivers providing developmental information over a six month period. Inter-judge reliability, test-retest reliability, inter-item reliability, and concurrent validity studies were conducted. Results indicated that the KIDS can be a reliable and valid indicator of development when used with this population.

Participant 2 Terry Stancin

The utility of the Kent Infant Development Scale

In addition to the reliability and validity of the KIDS, the similarity between the sequence of behavioral acquisitions between handicapped children and non-handicapped infants attests to the prescriptive merits of the KIDS. This scale makes cost efficient use of reliable and valid caregiver information as a basis for designing an individual habilitation program, for diagnostic purposes and for screening purposes. A system of computer softwear allows for efficient and objective scoring, interpretation and prescription for severely handicapped children whose developmental age is less than one year.

Participant 3 James Moe

The Minnesota Child Development Inventory for assessing moderately retarded children

The KIDS model for assessing severely and profoundly handicapped young children was extended to the assessment of moderately retarded children with the Minnesota Child Development Inventory. Studies investigated the reliability of parent and teacher completed inventories and the validity of the MCDI with the Stanford-Binet and the McCarthy Scales of Children's Ability as criteria. The MCDI was found to be particularily useful for program planning because of the specification of adaptive skills as well as the behavioral deficits of the children assessed. Computer based scoring and interpretation of the results aid in the efficient use of the results.

Table of Contents

The Adaptation of an Infant Behavior Measure for Severely Handicapped Young Children at the Hattie Larlham Foundation.

Reliability Studies on the *Kent Infant Development Scale* (KID Scale) with Severely Handicapped Young Children.

Item analyses of the *KID Scale* with Severely Handicapped Young Children.

A Validity Scale for the *KID Scale*.

The Concurrent Validity of the *KID Scale*
- The Concurrent Validity of the *KID Scale* with the *Bayley Scales of Infant Development* for the Developmental Assessment of Severely and Profoundly Handicapped Children.
- Validity of Caregiver Information on the Developmental Level of Severely Handicapped Young Children.

Developmental Sequence of Severely Handicapped Children according to the *KID Scale* and the *Bayley Scales of Infant Development*.

Follow-up Studies on the *KID Scale* Results for Severely Handicapped Young Children.

Summary of Consultant and Caregiver Evaluations of the *KID Scale*'s Use with Severely Handicapped Young Children.

Empirical Basis for the Construction of Prescriptive Programs for Severely Handicapped Young Children from the *KID Scale*.

Additional Papers on Severely Handicapped Young Children
- *The Kent Scoring Adaptation of the Bayley Scales of Infant Development*: Validity and Utility.
- The First Chance Project.

The Reliability and Validity of the Minnesota Child Development Inventory Used with Moderately Handicapped Children in Primary School.

The Use of the McCarthy Scales of Children's Abilities to Assess Mentally Retarded Children.

Summary of Consultant and Caregiver Evaluations of the Minnesota Child Development Inventory.

Dissemination Activities.

The Adaptation of an Infant Behavior Measure for Severely Handicapped Young Children at the Hattie Larlham Foundation.

Virginia Dunn, Terry Stancin, and Jeanette Reuter.

Presented at: TASH, Annual Meeting
Los Angeles, October 1980

MPA, Annual Meeting
Detroit, May 1981

Introduction

The measurement of the developmental status and the developmental progress of severely handicapped children has depended on the use of instruments designed for healthy young children and infants. Reports of the results of using infant tests such as the Bayley Scales of Infant Development (Brassell, 1977, Haskett & Bell, 1978, Reuter, Dunn & Craig, 1977) and the Uzgirus-Hunt (Wohlheuter & Sindberg, 1973) to study the development of severely handicapped young children have begun to appear only recently. For the most part, especially in clinical settings, infant tests have had to be used to assess handicapped young children. The infant test norms, as well as their reliability and validity coefficients, have been applied to both groups of children despite their basic differences in chronological age, health status and rearing milieus.

This paper uses data collected over the past few years from the caregivers of severely handicapped children through the use of the Kent Infant Development Scale (KID Scale) to begin assembling reliability estimates and concurrent and predictive validity coefficients for this group of children on an infant test. Three studies will be presented. The first study looks at the interjudge reliability of caregivers' reports on the size of the behavior repertoires of their severely handicapped charges and the effects of caregiver professional status and behavior domain on that reliability.

The second study was conducted to establish interjudge reliability estimates for both individual items and program prescriptions.

The third study looks at the developmental status and progress over a 12 month period of a group of severely handicapped children as described by the KID Scale. These three studies are presented following a description of the data pool on which all studies were based.

Description of the Data Pool

A. Measure

The data used to describe the behaviors of the handicapped children was obtained from the Kent Infant Development Scale (KID Scale). This is a caregiver-completed inventory consisting of 252 behaviors usually developed during the first year of life. Each item has an age norm derived from a sample of 383 presumed healthy infants. The behaviors are grouped into five domains: cognitive, motor, language, self-help and social. The KID Scale Manual, test booklet and answer sheet are available upon request. Developmental ages for the full scale and the five domains can be derived from the number of items endorsed on the KID Scale by an infant's caregiver. A computer scored report displays the individual infant's developmental status in the five domains.

B. Subjects

The subjects from the samples for the three studies described below were drawn from a data pool consisting of 154 children living at an intensive care facility for mentally retarded children. Each child in the pool had from 1 to 7 KID Scales completed by childcare aides, teachers, nurses, therapists, or parents. The children ranged in age from six months to twelve years with most of the children in the data pool under eight years of age. Their diagnoses were severe or profound retardation with multiple handicaps. Most of the children are non-ambulatory and non-verbal.

Study 1: Interjudge Reliability

Subjects

Three caregiver samples from the data pool previously described were collected to compare the reliability of different types of caregivers completing KID Scales on handicapped young children. The first sample consisted of pairs of non-professional direct-caregivers, the second of direct-caregivers paired with professionals and the third of pairs of professionals. Although there was no duplication among children in and across the three groups, there was approximately a ten percent duplication among observer pairs within the three caregiver samples.

Twenty-two direct-caregiver pairs observed the first sample of children. Direct-caregivers generally had no education beyond high school or formal training in behavioral observation. Their job was to give physical care to the children although in recent years some inservice training and responsibility for developmental programming activity had been given to them. The twenty-one children observed by this sample of caregivers were 13 males and 9 females. Their age ranged from 17 to 127 months and their mean age was 51.39 months.

In the second sample there were 21 direct-caregiver/ professional pairs. The direct-caregivers were described previously. Among the professionals were 11 teachers and 10 ward managers. The ward managers are in charge of developmental programming activities for each ward. The teachers are employed by the local public school district and work daily with the children within the institution. The professional sample members are college trained in education or the social sciences. The mean age of the 21 observed children (7 females and 14 males) in this sample was 71.57 months, their ages ranging from 8 to 117 months.

In the third sample there were 21 professional pairs. Eleven were teachers, one was a nurse, and the remaining 30 were ward managers. Twenty-one children, 12 males and nine females, were observed for this sample. Their mean age was 93.45 months, ranging from 20 to 153 months.

The three samples for this study were gathered by selecting pairs of KID Scales on an individual child which had been completed within two months of each other. The mean number of days between tests for each sample are 12.64 days for the direct-caregiver pairs, 23.86 days for the direct-caregiver/professional pairs and 11.38 days for the professional pairs. The pairs of KID Scales were then assigned to the direct-caregiver pairs sample, the direct-caregiver/professional sample or the professional pairs sample depending on the composition of the observer pairs. If there was more than one possibility of pairs, for a particular child, i.e., if both a pair of direct-caregivers and a pair of professionals had completed KID Scales on the child within a two month period, the direct-caregiver sample received the pair, then the direct-caregiver/professional sample and finally the professional pairs sample received the pair. A pair of KID Scales was discarded if more than ten items were omitted.

Results and Discussion

The mean number of KID Scale items endorsed for each of the pair samples are presented in Table 1.

Six one-way analyses of variance were conducted, one for each domain and one for the full scale scores using the average number of items endorsed by each pair of observers and the average variance for each pair. No significant differences in number of items endorsed were found among the three samples on any of the domains. Thus, although the mean chronological ages of the children observed by the different observer pair groups differed by as much as 40 months, their developmental statuses do not differ. It has been our experience in these and earlier studies on the developmental

Table 1

Mean Number of KID Scale Items Endorsed by Caregiver Pairs*

	Cognitive Domain		Motor Domain		Language Domain		Self Help Domain		Social Domain		Full Scale	
	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2
Direct Caregiver Pair	10.00	12.50	12.21	15.00	12.68	11.41	11.59	12.77	13.86	14.45	58.95	64.86
Direct Caregiver/ Professional Pair	11.19	10.43	16.29	14.19	11.00	8.24	12.57	12.29	13.71	10.62	63.62	55.10
Professional Pairs	10.86	11.95	17.67	18.33	10.71	10.81	13.48	11.81	12.33	12.29	64.19	64.49
$\overline{X}$	10.68	11.62	15.41	15.84	11.46	10.15	12.54	12.29	13.30	12.45	62.25	61.49
	11.155		15.625		10.80		12.41		12.87		61.87	

*All N. S.

status of severe and profoundly handicapped young children that chronological ages do not account for significant amounts of variance in developmental status. This is not true of healthy children, of course.

Correlations between the direct-caregiver pairs, the direct-caregiver/professional pairs and the professional pairs were computed for each of the five domains and the full scale. These correlations and their Fischer z'transformations are presented in Table 2. Six chi-square tests were conducted to see whether the professional training of the observers resulted in significant differences in interjudge reliability in domain and full scale scores. Those columns within which the observer samples differed significantly from each other in reliability are indicated by asterisks.

Of the three samples of caregiver pairs, the direct-caregiver interjudge reliability coefficients were the lowest in the motor and full scale where the chi-squares indicate significant differences. The direct-caregiver/professional pairs had the lowest reliability on the social scale which also yielded a significant chi-square. In every instance, across all domains and the full scale, regardless of whether the differences among interjudge reliability coefficients were significant or not, the professional pairs sample achieved the highest reliability. Except for two reliability coefficients which were below .70, the coefficients in general were satisfactory.

Table 2

Interjudge Reliability Coefficients
with Fisher z Transformations

	Cognitive	Motor**	Language	Self Help	Social*	Full Scale**
Direct Caregiver Pair r	0.81	0.76	0.72	0.76	0.81	0.82
z'	(1.127)	(0.996)	(0.996)	(0.996)	(1.127)	(1.157)
Direct Caregiver/ Professional r Pair	0.89	0.91	0.69	0.92	0.67	0.86
z'	(1.422)	(1.528)	(0.848)	(1.589)	(0.811)	(1.296)
Professional r Pairs	0.93	0.98	0.83	0.92	0.95	0.96
z'	(1.658)	(2.289)	(1.188)	(1.589)	(1.832)	(1.946)

* p<.01
** p<.001

Study 2: Item Reliability

Subjects

Pairs of caregiver KID Scale reports on fifty-two children were selected from the data pool, 27 male, 25 female to explore prescriptive reliability and item by item percent agreement. The mean age of the children was 79.15 months. There were 34 children observed by two professionals, three observed by two non-professionals, and 15 observed by a professional, non-professional pair.

Procedure

The children had two caregivers observe each of them within a 1-week period. Two reliability estimates based on percent agreement were constructed.

1) Prescriptive Reliability. According to instructions in the KID Scale Manual (1980), the observer reviews the KID Scale computer report, domain by domain, finding within a domain where four consecutive D's or failures first occur. This is called the area of emergent skills. This determination is possible because the computer-scored report presents the item responses in order of item age norms. For this study we took the two completed reports for each child and located the areas of emergent skills. We then found the discrepancy between areas on the two KID Scales. To assess the appropriateness of the emergent skill area designation of

20

four consecutive failures, the procedure was then repeated using a three failure criterion and the results were compared.

2) Percent agreement. Two percent agreement indices were calculated between caregiver pairs: the first by computing the percent agreement from all the items in each domain, and the second by computing the percent agreement from above the area of emergent skills. The latter percent agreement index was an attempt to control for an inflation of reliability estimations based on many negative response items.

Results and Discussion

1) Prescriptive reliability. The mean level of agreement about the location of the area of emergent skills for four consecutive failures and three consecutive failures are presented in Table 3. The mean four D and three D discrepancies between caregivers are 5.37 and 4.77 respectively. A 2x5 analysis of variance was conducted to examine the difference between these two discrepancies. No significant main effects or interactions were found. Thus, there seems to be little reliability advantage to either a three or four D area in a population of severely handicapped children. However, an area of discrepancy as large as four or five items can completely displace the emergent skill area and consequently misdirect prescriptive programming based on one scale alone.

Table 3

Mean Discrepancies Among Caregiver Pairs for Emergent Skill Areas of Four Successive D's and Three Successive D's

Domain	Four D's $\bar{x}$	Three D's $\bar{x}$
Cognitive	4.2549	3.8235
Motor	5.3654	4.6538
Language	6.3654	4.3846
Self Help	5.7885	5.4423
Social	5.0577	5.5192

2) Percent agreement. The mean item by item percent agreements for each domain using all items in a domain and using items from the area of emergent skills are reported in Table 4. Examination of Table 4 indicates that the percent agreement is higher where all items in a domain are used rather than calculating from the area of emergent skill. This would be expected because it is probably easier to agree on the absence of a behavior than on the presence of a behavior.

Thus the hypothesis that percent agreement should be calculated using items to the area of emergent skills, a maximally conservative estimate, is not strongly endorsed. On the other hand we did not wish to err in the direction of using too liberal an estimate by using the full set of items for a domain in calculating percent agreement. Because the percent agreement to the area of emergent skills is overly conservative and the alternative method too liberal, the average of the two methods is recommended as the best estimate of the percent agreement when the KID Scale is used to observe severely and profoundly handicapped children.

Table 4

Percent Agreement Between Pairs of Caregivers for Bottom Line Percent Agreement and Total Scale Percent Agreement

	Mean Bottom Line Percent Agreement	Mean Total Percent Agreement
Cognitive	80.23%	89.87%
Motor	81.14	91.68
Language	77.49	85.91
Self Help	76.25	84.83
Social	77.02	85.86

Study 3: Longitudinal Study of Developmental Progress

Subjects and Procedure

To describe the development of profoundly handicapped children a longitudinal study was conducted using a sample drawn from the previously described data pool. Two KID Scale reports 12-13 months apart were available for each of the 34 children selected as subjects. Because of the demonstrated higher reliability of professional caregivers' reports (see study 1), the KID Scales selected for use in this study were all completed by the professional staff members of the residential treatment center, i.e., nurses, teachers, ward managers and therapists rather than direct care aides. In addition, only those KID Scales in which there was no missing information (i.e., items left blank) were used. Developmental progress over a year's time for the children in this sample was described by the KID Scales and the correlations of the first and second test scores were calculated.

Results and Discussion

While test results from the two administrations are highly correlated (Table 5) there were no overall significant changes in mean scores in any domain. Thus, in the absence of any specifically defined habilitation program, this sample did not appear to advance developmentally during the twelve month interval between testings (Table 6). Significant developmental

Table 5

Predictive Validity Coefficients by Domain

Domain	r*
Cognitive	0.7833
Motor	0.9169
Language	0.7219
Self Help	0.9443
Social	0.8167
Full Scale	0.8898

*p<.001

Table 6

Mean Raw Scores and Developmental Ages for Test 1 and Test 2.

Domain	$\overline{X}_1$*	D.A.$_1$**	$\overline{X}_2$	D.A.$_2$
Cognitive	11.53	3.5	10.29	3.0
Motor	13.29	3.3	13.18	3.3
Language	10.74	3.6	10.18	3.5
Self Help	11.62	4.6	11.71	4.6
Social	11.94	4.1	11.91	4.1
Full Scale	57.94	3.6	56.65	3.6

* Mean raw score.
**Developmental age in months.

advances over a year made by severely or profoundly handicapped children, as indicated by a KID Scale report, may therefore be largely attributable to a successful program rather than to maturation. It is not to be expected that groups of severely handicapped children who are not the target of intensive structured developmental interventions will acquire new behavioral competencies if they are simply physically well cared for.

Conclusions

Since all of the data was gathered and collected for the purpose of individual clinical evaluations and not specifically for the studies reported herein, this work must be regarded as a pilot level descriptive effort. The four samples drawn from the data pool were all subject to different constraints. Therefore, in some studies, no caregiver was used more than once but in others about 10% of the caregivers were duplicated and in one study caregivers were not identified by name so no estimate of caregiver overlap is possible. Some of the children from the data pool appear in more than one study, some in only one and some in no study. The KID Scales were completed by direct-caregivers as well as a variety of professionals all of whom worked under at least two different administrative regimes. The drawing of the samples is described under each study and the N's of the studies are determined by the sample characteristics. It is, in each case, much less than 154. In some of the studies, reliability figures for the KID Scales are reported and in others reliability estimates are not available.

All of the study findings must be looked at with these limitations in mind. At minimum, we have, however, a number of statements to make about the reliability of the KID Scale when it is used to describe profoundly handicapped children who live in a residential setting. We can also describe the developmental status and progress of the children in our sample as measured by the KID Scale.

Reliability

Good psychometric practice requires that reliabilities be computed for each score used. Berk (1979) lists some 17 alternatives which have been used. The interjudge reliabilities in our studies under the best of circumstances, namely when two professionals are used as observers, are at .85 or above for all domains except language (.83).

The reliability of the location of the area of emergent skills did not differ between using 3 or 4 D's to define it. Both location definitions yielded interjudge discrepancies of about five items on all domains which is larger than the area itself. Therefore, the reliability of the location of the emergent skill area poses problems for IPP designers.

Item by item percent agreements for all domains were above 85% when all items on a domain were compared. This is used as a criterion level for observation studies in the literature. When the percent agreements are based on those items which are likely to be performed, it dropped to 78%.

Developmental Progress

The lack of any overall change in status over a year's time in the sample for Study 3 suggests that severely handicapped children may develop in qualitatively different ways from healthy infants.

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Dunn, Stancin, & Reuter -- Addendum

Concurrent Validity Estimates for the KID Scale.

Table I Validity Coefficients*

	r
Sample 1 (n=27)	.92
Sample 2 (n=17)	.96
Sample 3 (n=15)	.74

*Pearson-product moment correlations of Full Scale Scores of the KID Scale and Bayley Mental Scale. All correlations were significant, ($p<.01$).

Table II Developmental Age Estimates (in months)**

	Sample 1		Sample 2		Sample 3	
	$\bar{X}$	Med.	$\bar{X}$	Med.	$\bar{X}$	Med.
KID Scale (Full Scale)	4.5	3.6	7.0	7.1	6.9	6.8
Bayley Scale (Mental)	3.5	3.0	4.5	3.5	5.0	6.0

**Developmental age estimates are converted from $\bar{X}$ and Median raw scores.

252 Lowry Hall
Kent State University
Kent, Ohio 44242

Reliability Studies on the Kent Infant Development Scale (KID Scale) with Severely Handicapped Young Children.

Jeanette Reuter, Virginia Dunn & Terry Stancin

Studies

Data Pool

A data pool describing the development of 121 severely handicapped children ages two years to eight years has been assembled from five field sites in the United States. The sites and the field workers are as follows: Boston, MA (Anne Copeland), Los Angeles, CA (Katherine Reuter), Statesboro, GA (Cynthia Legin), Bradenton, FLA (Frances Archer) and Kent, OH (Virginia Dunn) and project home office staff. For each child, we have age, sex, and diagnoses, two KID Scales completed about two weeks apart and one about six months later from each of two of the child's caregivers, an individual habilitation plan (IHP) developed from information on the second KID Scale, Bayley Scales (MDS and PDS) administered during the original two week testing period, and field worker and caregiver evaluations of their experience with the KID Scale. For participating caregivers there is a record of the length of time they have cared for the child, their relationship to the child, their profession and their level of education. This data is complete for all 121 children with the exception of follow-up KID Scales for about 15 children for the Boston sample. We expect these protocols to be completed by November.

Each child was observed by a unique pair of caregivers and no caregiver completed KID Scales on more than three children. The same two caregivers completed the first two

KID Scales on all of the children. However, after six months follow-up passed we were not always able to get both caregivers to do the third KID Scale. Each child had at least one continuing caregiver.

The studies which were designed to analyze the data from the first four KID Scales and the Bayley Scales have been completed. Table I describes the samples drawn from the data pool which were constructed for the various studies.

Test Retest Correlation Study

This is a study of caregiver response stability over time. The degree to which caregivers in general and subsets of caregivers see the same number of behaviors and arrive at the same D.A. on each of two observations is explored. Because Developmental Age and the number of items passed are not on the same scale of measurement (number of items is an interval scale while D.A.'s are on an ordinal scale) separate analyses for D.A. and number of items passed were conducted.

The subjects for this study consisted of 121 caregivers observing 121 different children. The caregivers consisted of 45 parents, 29 teachers, 4 nurses, 30 child-care aides, 3 habilitation specialists, 4 therapists and 6 teacher's aides. The mean level of education of the caregivers was 13.9 years. The average number of months

Table I

Study Samples

KIDSMASTER
(Data Pool)

Individual
Caregivers

Test/Retest Correlation Sample (N = 121 children, 121 caregivers)
A KIDS completed for each child by a caregiver on 2 occasions with each child and each caregiver used only once.

Item Age Norm Validity Sample (N = 121 children, 121 caregivers)
Same as above with the second test used.

Test/Retest % Agreement Sample (N = 112 children, 112 caregivers)
Same as above except that it is a proper subset of the interjudge % agreement sample.

Concurrent Validity Sample (N = 106 children, 106 caregivers)
Most reliable caregiver's second KID Scale and BSID scores.

Pairs of
Caregivers

Interjudge/Correlation Sample (N = 112 children, 224 caregivers)
A caregiver could report on as many as 3 children but each child and each caregiver pair is unique.

Interjudge/Percent Agreement Sample (N = 112 children, 224 caregivers)
Same as above.

caring for the children was 25.3 months. The children's average full scale developmental age derived from the first and second KID Scales was 6 months. Their chronological ages ranged from 18 months to 108 months ($\overline{x}$ 60 months). Seventy-one were males and 50 were females.

Procedures:

Each caregiver reported on a child on the KID Scale on two occasions. The average interval between observations was about two weeks. The range was judged to be from ten days to 25 days.

Results:

Initially 12 correlations were computed using the five domain raw scores and the full scale raw scores; the five domain D.A.'s and the full scale D.A.'s derived from the KID Scales. These findings are presented in Table II below.

Table II

Test Retest Correlations

	Raw Score	D.A.s
Cognitive	.98	.97
Motor	.99	.99
Language	.96	.95
Self-Help	.98	.96
Social	.97	.96
Full Scale	.99	.99

After the initial Test Retest Study with all Ss (caregivers), three subgroups were created: parents, professionals and nonprofessionals. Included in the parent sample were foster parents and grandparents. Teachers, nurses, therapists (O.T. and P.T.), habilitation specialists and people with associate degrees comprised the professional sample. The nonprofessional sample included teacher aides, nursing aides and physical and occupational therapy aides. The caregiver characteristics can be seen in Table III.

Table III

Sub-sample Characteristics

	Prof. (N=40)	Non P. (N=36)	Parents (N=45)	Total (N=121)
Years of Education	16	13	13	14
Numbers of months caring for the child	10	10	51	25

Table IV contains the test-retest correlations for the three subsamples.

Table IV

Subsample Test Retest Correlations

	Professional		Non-Professional		Parents	
	Raw Score	D.A.	Raw Score	D.A.	Raw Score	D.A.
Cognitive	.98	.95	.97	.96	.98	.98
Motor	.99	.99	.98	.98	.99	.99
Language	.95	.96	.96	.95	.94	.94
Self-Help	.98	.97	.98	.92	.97	.97
Social	.97	.97	.96	.96	.96	.96
Full Scale	.99	.99	.99	.99	.99	.98

The consistency of observers of KID Scale reports over a short interval is almost perfect. The correlations do not vary among subgroups, domains or raw and developmental age scores.

Interjudge Reliability Coefficients

An important characteristic of a developmental caregiver report is the extent to which two different caregivers observing the same child arrive at the same developmental age. In this study the relationship between the raw scores for a given child reported by two caregivers and the relationship between the developmental ages derived from those reports are examined.

Subjects:

One hundred twelve caregiver pairs participated in this study. Any one member of a pair could report on up to three children. However, no caregiver pair was repeated.

The characteristics and occupations of the caregivers are very similar to those tabled for the preceding study. Nine children and their caregivers were dropped from this study because of missing data. The children observed ranged in age from 18 months to nine years. Their average D.A. derived from their KID Scales was six months. There was no overlap among the children in the study.

Procedure:

Each member of the caregiver pair completed a KID Scale on one child. The observations were made in general within two or three days of each other. [The average interval between observations was three days, the range was from one to ten days .] Two weeks after the first set of observations was made by the caregiver pair, a second set of observations was made yielding two samples for inter-judge reliability replication.

Results:

Both raw scores and D.A.'s from the caregiver reports were computed for the first and second set of KID Scale observations. These correlations are presented in Table V, both the first and second testings, comparing caregiver one's with caregiver two's developmental ages. This allows us to describe not only the correlation between judges but the similarity of the developmental levels derived on the same children. Dependent T-tests were also computed to see if either set of caregivers observed the children more developmentally advanced. All of the dependent t's from both the first testing and second testing were non-significant.

Table V

Interjudge Reliability Correlations

	First KID Scales		Second KID Scales	
	Raw Score	D.A.	Raw Score	D.A.
Cognitive	.85	.84	.83	.82
Motor	.96	.95	.94	.94
Language	.72	.69	.71	.71
Self-Help	.92	.91	.91	.88
Social	.77	.76	.74	.73
Full Scale	.89	.89	.87	.87

Percent Agreement Studies

The use of the KID Scale for prescriptive planning requires attention to single items. In addition, the KID Scale is a behavioral instrument. The traditional procedure for assessing the reliability of behavioral instruments is a percent agreement between observers for a target behavior. In order to assess the prescriptive merits of the KID Scale while applying the investigative procedures used to analyse behavioral instruments, two item by item percent agreement studies were conducted: an interjudge study and a test retest study.

Subjects:

The pairs of caregivers and children in the interjudge percent agreement study are the same as those that participated in interjudge correlation study. All non-repeated caregivers who were in the interjudge study were selected for the test retest percent agreement study. Thus the caregivers in the test retest sample are a subset of the interjudge sample.

Results:

Two percent agreement indices were calculated for each domain. The first was simply the number of agreements between the two caregivers on the scale divided by the number of items x 100. The second index referred to as the shortened form index, was calculated by finding the number of agreements between the two scales with one difference; the agreements were counted until four consecutive failures on either scale were encountered. The number of items up to the four consecutive failures was divided into the number of agreements up to that point forming the shortened form index for percent agreement.

Two percent agreement studies were conducted with the interjudge sample. The first was from the first two KID Scale administrations and the second was from the second KID Scale administration. The total scale percent agreements and the shortened form index are presented in Table VI.

Table VI

Interjudge Percent Agreement Means

N = 112

	First KID Scales				Second KID Scales			
	Total Domain	N	Shortened Domain	N	Total Domain	N	Shortened Domain	N
Cognitive	82%	112	78%	108	75%	112	63%	111
Motor	82%	112	77%	101	82%	112	68%	109
Language	85%	112	76%	74	72%	112	62%	108
Self-Help	85%	112	73%	109	79%	112	73%	110
Social	80%	112	68%	99	71%	112	61%	112

A single percent agreement study was conducted on the test retest sample. Results from this study are presented in Table VII.

Table VII

Test Retest Percent Agreement Means

	Total Domain	N	Shortened Domain	N
Cognitive	91%	112	84%	110
Motor	93%	112	85%	108
Language	90%	112	85%	106
Self-Help	92%	112	88%	110
Social	89%	112	84%	112

Item Analyses of the KID Scale with Severely Handicapped Young Children.

Virginia Dunn and Jeanette Reuter

This study was conducted to discriminate between those items which elicited agreement between two caregivers and those which failed to elicit agreement between caregivers. Those items which elicit high rates of disagreement are candidates for rewording or revision in the Handicapped Edition of the KID Scale.

Sample

One hundred and twelve pairs of caregivers completed KID Scales on 112 different children. The KID Scales were completed within one week of each other. The children were all severely handicapped children under the age of nine years and all had developmental ages that fell in the range of 2 - 13 months. The pairs of caregivers were all unique, that is no two pairs had identical caregivers. The percent agreement was always conducted on the second test each caregiver had completed on a child. The caregivers and children were a subset of the KIDSMASTER sample which is decribed elsewhere.

Analysis

Item by item percent disagreements across caregivers were calculated. The item percent disagreements were divided into those falling at and below the 33rd percentile (low disagreement), those falling at and below the 66th percentile and above the 33rd percentile (medium disagreement), and those below 100th percentile and above the 66th percentile (high disagreement). For each item the percent of first caregivers who endorsed the item and the second caregiver who endorsed the item were calculated. The mean percent endorsement for each item was then calculated. The mean percent endorsements were divided into those endorsements falling at and below the 33rd percentile (low endorsement), those falling at and below the 66th percentile and above the 33rd percentile (medium endorsement), and those falling at and below the 100th percentile and above the 66th percentile (high endorsement).

Two tables were constructed for each domain. The first table for a domain contains the item numbers according to the level of endorsement and the percent disagreement. (See Tables, 1, 3, 5, 7, and 9.) The second table for a domain contains the item number and stem. (See Tables, 2, 4, 6, 8 and 10.) All items contained in the second tables for each domain were in the high disagreement category. Those that were highly endorsed appear first, those in the medium endorsement category appear next, and those in low endorsement category appear last. It is these last group of items which will be scrutinized for ambiguity of wording more closely.

The opportunity for disagreements between caregivers is greater on those items where the percent agreement is higher. It is easier to agree that someone does not do anything than to agree that they do something specific. Therefore, in order to be a candidate for rewording, the level of disagreement necessary will be dependent on the percent endorsement of an item.

The percent disagreement elicited by items ranged from 2.68% to 44%.

Table 1

Items from the Cognitive Domain by Endorsement and Disagreement

	High Percent Endorsement 82.5 - 47.0	Medium Percent Endorsement 46.5 - 30.0	Low Percent Endorsement 29.5 - 7.5
High Percent Disagreement (23.21 - 36.61)	16 105 181 74 187 88 204 41 62 128 142	245 203 236	52 188 38 26
Medium Percent Disagreement (17.07 - 22.32)	46 75 50 186	127 37 215 246 129 18	226 144 116 89 73
Low Percent Disagreement (15.18 - 8.04)	201 202 106 65	214 200 154 63 27 95 6	39 249 79 218 228 202 17 227

Table 2

High Disagreement Items from the Cognitive Domain

Level of Endorsement	Item Number	Stem
High Endorsement	16	shakes rattle placed in hand
	74	eyes watch hands moving
	88	interested in image of self in mirror
	41	imitates "ma-ma" or "da-da"
	128	recognizes mother's voice
	105	smiles at mirror image
	187	smiles at the sight of favorite toy
	204	enjoys looking out a window
	62	smiles at the sound of rattle or bell
	142	looks intently at objects and becomes quiet
	181	gets startled by sudden voices or noises
Medium Endorsement	245	tries to catch moving objects
	203	smiles at the sight of a new toy
	236	tries to touch moving objects
Low Endorsement	52	plays with dolls
	188	plays with two toys at the same time
	38	interested in photographs
	26	avoids objects that might give pain

Table 3

Items from the Motor Domain by Endorsement and Disagreement

	High Percent Endorsement 85.5 - 45.0	Medium Percent Endorsement 43.5 - 28.5	Low Percent Endorsement 28.0 - 9.5
High Percent Disagreement (33.04 - 16.07)	159 167 146	149 8	56
	160 211 45	217	220
	133 94 42	10	110
	55 68 31	232	
	44 80 111	136	
	222		
Medium Percent Disagreement (15.18 - 8.93)	148 123	134 238	193
	109 96	22 190	82
	147 172	120 58	157
	57 32	239 43	247
	229 69	121	191
	87 135	132	171
Low Percent Disagreement (8.04 - 2.68)	207	24 9	124 209
		210	175 208
		221	184 183
		122	174 97
		242	11 240
		219	81 231
		230	241 173
			112 158

Table 4

High Disagreement Items from the Motor Domain

Level of Endorsement	Item Number	Stem
High Endorsement	159	can turn around when left lying on the floor
	160	touches feet with hands
	133	sits with some support with head steady
	55	tries to grab small objects nearby
	44	places feet on floor if held in a standing position
	167	sits leaning on hands
	211	rubs eyes
	94	grabs for a toy that is brought near
	68	holds a toy
	80	turns head freely when sitting
	146	shakes a rattle
	45	pushes chest of the bed when lying on stomach
	42	fist opens if touched by a toy
	31	hands closes if toy is placed in palm
	111	sits on your lap
	222	turns head away when you try to clean nose
Medium Endorsement	149	uses one hand to hold a toy and the other to play with it
	217	holds two things at a time, one in each hand
	10	bounces up and down if held under arms
	232	holds a doll-sized object
	136	can place a toy down softly
	8	picks up objects just using finger and thumb
Low Endorsement	56	tears paper using two hands
	220	walks a few steps without help
	110	plays with two or more objects at the same time

Table 5

Items from the Language Domain by Endorsement and Disagreement

	High Percent Endorsement 83.5 - 57.5		Medium Percent Endorsement 53.5 - 26.5		Low Percent Endorsement 24.5 - 6.0		
High Percent Disagreement (43.57 - 27.68)	169	108	53	237			
	131	103	205	107			
	28	40	7				
	118		119				
Medium Percent Disagreement (25.00 - 19.64)	76	67	19	168	189		
	66	182	206	93			
	84		130				
	216		91				
Low Percent Disagreement (18.75 - 2.68			72		29	155	30
					156	78	145
					92	54	77
					41	20	

Table 6

High Disagreements Items from the Language Domain

Level of Endorsement	Item Number	Stem
High Endorsement	169	repeats certain sounds over and over
	131	voice is sometimes loud, sometimes soft
	28	"talks" in his or her own language
	118	makes sounds when talked to
	108	turns head quickly toward a familiar voice
	103	turns when his or her name is heard
	40	uses voice to show emotions other than crying
Medium Endorsement	53	whimpers or cries when scolded
	205	babbles when alone in crib
	7	imitates sounds like coughs, clicks, and grunts
	119	stops when his or her name is said
	237	sqeals
	107	stops when you yell "stop"
Low Endorsement	---	--

Table 7

Items from the Self-Help Domain by Endorsement and Disagreement

	High Percent Endorsement 93.0 - 61.5	Medium Percent Endorsement 57.5 - 38.0	Low Percent Endorsement 36.5 - 15.5
High Percent Disagreement (29.46 - 17.86)	70 162 3 33 71 83 243 197	177 99 12 212	248
Medium Percent Disagreement (16.96 - 13.39)	100 117 1	113 233 23 252 2	251 244 223 21 150 195
Low Percent Disagreement (12.50 - 7.14)	196 47	161 114 125 59	234 250 176 194 98 34

Table 8

High Disagreement Items from the Self-Help Domain

Level of Endorsement	Item Number	Stem
High Endorsement	70	opens mouth for bottle or breast
	3	sucks food of spoon
	71	eats new foods without a figth the first time offered
	243	keeps food in mouth
	162	swallows food without any gagging, coughing, or choking
	33	swallows liquids without choking
	83	eats mashed table foods when fed
	197	holds spoon for a second when it's places in his or her hand
Medium Endorsement	177	sucks and gums pretzels or cookies
	99	chews food
	12	helps in dressing by pushing arms though sleeves
	212	drinks from a cup held by an adult, without spilling
Low Endorsement	248	lifts leg while diaper is being changed

Table 9

Items from the Social Domain by Endorsement and Disagreement

	High Percent Endorsement 97.5 - 51.0			Medium Percent Endorsement 50.0 - 30.0		Low Percent Endorsement 27.0 - 10.0		
High Percent Disagreement (44.64 - 27.68)	101	103	24	53	60			
	115	85	224	90	198			
	13	178		185	141			
	143	151		139				
Medium Percent Disagreement (26.79 - 20.54)	48	140		4	126	104	153	163
	102			61	164	86	168	20
	179			15		166		30
	138			35		5		
Low Percent Disagreement (19.64 - 6.25)	170			46		25	152	163
	14			199		165	180	20
	137			213		39	64	30
						225	36	

Table 10

High Disagreement Items from the Social Domain

Level of Endorsement	Item Number	Stem
High Endorsement	101	babbles when talked to
	115	smiles at some people, but not others
	13	looks at people and becomes quiet
	143	reacts to peek-a-boo games
	193	turns when his or her name is heard
	85	likes and splashes in bath
	178	reacts differently to strangers than to familiar faces
	151	recognizes most familiar adults
	24	tries to get attention of an adult by smiling or babbling
	224	tries to get attention of an adult by crying or whining
Medium Endorsement	53	whimpers or cries when scolded
	90	stops when you say "no"
	185	smiles if an adult makes a funny face
	139	gets upset if left alone in a room
	60	shows jealousy
	198	laughs if an adult makes a funny face
	141	hugs and shows affection for father
Low Endorsement	---	--

A Validity Scale for the *KID Scale*.

Christine Gidycz and Jeanette Reuter

A Validity Scale for the Kent Infant Development Scale

The Kent Infant Development Scale (KID Scale), which is used to assess the developmental ages of children with developmental ages ranging from birth to 15 months consists of a sample of 252 infant behaviors. After reading each item, a child's caregiver answers either a) yes, b) yes, but outgrew it, c) used to do it, but is no longer able to, or d) no, cannot do it yet (Katoff, Reuter, & Dunn, 1980). This test has been used to assess the developmental status of both normal and handicapped children. In the latter case, habilitation programs have been designed from the caregiver information obtained from the KID Scale. Since the KID Scale does use caregiver information, it is subject to biases and distortions often found when using reports from others. Accordingly, Maloney and Ward (1980) state, "In assessing the typical behavior of an individual by the reports or impressions of others, the adequacy of the assessment is obviously dependent on the adequacy and reliability of these 'others'" (p. 319). They further state that in using an assessment device that relies on information from others, one must contend with the possible distortion in perceptions that may occur.

Due to the biases sometimes exhibited in caregiver reports, Gajdzik (1980) began the construction of a validity scale for the KID Scale. It is believed that this scale will detect carelessness in responding or misinterpretation of items by the caregiver. This scale, which was called the Inconsistency Scale, was based on the logical consistency of item pairs. In all instances, if children's caregivers respond that they are able to do the first item in an item pair (answer choice a or b), they must also respond that the children are able to do the second item in that pair, in order to be consistent. For example, if caregivers answer yes to item 231 (walks alone well), they must also answer yes to item 220 (walks a few steps without help), in order to be logically consistent. Similarly, if caregivers respond yes to item 115 (smiles at some people, but not others), to be consistent they must also respond affirmatively to item 137 (smiles). Caregivers' Inconsistency Scale scores are equal to the number of item pairs that are answered inconsistently. Consequently, the higher the Inconsistency Scale score, the more questionable the validity of the information obtained from a particular caregiver.

In order to revise the Inconsistency Scale, data from a sample of KID Scales collected by Gajdzik (1980) was reviewed. There were five samples of normal and handicapped children for which Inconsistency Scale scores were calculated for each caregiver. In addition, she tabulated the frequency of inconsistency points scored, across caregivers, for each item pair. In most instances, those item pairs that had three or more inconsistency points tabulated for them were eliminated. Thus, on an empirical basis, items were eliminated which were assumed not to be logically dependent upon each other. In addition 22 pairs of items were added to the Inconsistency Scale which yielded a scale of 76 item pairs.

Two studies were then conducted to test the validity of the revised Inconsistency Scale. It was assumed that these two studies would illustrate the utility of the Inconsistency Scale for detecting invalid respondents.

Study 1

The range of Inconsistency Scale scores was obtained from a sample of normal infants' KID Scales ages 6/7 months and 12/13 months.

Method

Subjects. The subjects were 61 presumed healthy infants aged 6/7 and 12/13 months. The caregivers, who filled out the KID Scales, were the infants' mothers. The caregivers resided in Northeastern Ohio and had at least a high school education.

Procedure. KID Scales were selected from a sample of Katoff's (1978) data and Inconsistency Scale scores were tabulated for 6/7 and 12/13 month old children. In this study, since it was assumed that educated caregivers would be more consistent in their responding than caregivers with little education, caregivers with at least a high school education were selected. A sample of 61 of Katoff's KID Scales met this criterion (filled out by educated caregivers describing 6/7 or 12/13 month old children). The Inconsistency Scale scores for each age group were then tabulated as well as the frequency of inconsistency points scored, across caregivers, for each item pair.

Results

It was found that 87% of the caregivers received an Inconsistency

Scale score of a two or less with the range of scores being 0-5.

The frequency of illogical responses for each item pair was also tabulated. Only eight item pairs were missed by three or more caregivers. Five of the eight item pairs that were missed by three or more caregivers were eliminated from the scale. Three of these eight item pairs were not eliminated, since both items in each pair were almost identical. It was assumed that in order to be consistent, a caregiver who responded yes to the first item in the pair would also have to respond yes to the second item for each of these three item pairs. Finally, 18 additional item pairs were eliminated from the Inconsistency Scale (although they were not missed by three or more caregivers). These items were eliminated, since the same KID Scale items appeared in more than two item pairs. Thus, now the total Inconsistency Scale score will not be dependent on any single KID Scale item. The revised edition currently consists of 53 item pairs.

Study 2

The purpose of this study was to investigate whether or not Inconsistency Scale scores would differ as a function of the educational level of the caregivers. It was expected that the caregivers with the greatest amount of education would exhibit the greatest consistency in their responding. Therefore, it was assumed that the high education caregivers would have lower Inconsistency Scale scores than the low education caregivers.

Method

Subjects. The subjects were 70 presumed healthy infants ranging in age from 2-15 months. The caregivers, who resided in Northeastern Ohio, were the infants' mothers and their educational levels ranged from 7-18 years (Katoff, 1978).

Procedure. By reviewing the educational levels of the caregivers, these KID Scales were broken down into a low education and a high education group. The caregivers, who filled out the KID Scales, with 7-10 years of education were assigned to the low education group, while the high education group consisted of caregivers with 14-18 years of education. Each group consisted of 35 caregivers and their children. The children in both the groups were matched according to age.

A computer program, VALIDITY SCALE, was written in order to obtain Inconsistency Scale scores in an efficient manner. Inconsistency Scale scores were compared for the two groups.

Results

The frequency of Inconsistency Scale scores were tabulated for each group. In the low education group 83% of the caregivers received an Inconsistency Scale score of a two or less, while in the high education group 97% of the caregivers obtained an Inconsistency Scale score of a two or less. In the high education group, the scores ranged from 0-4, while 0-6 was the range of scores in the low education group. The mean Inconsistency Scale scores for the high and low education groups were 0.57 and 1.34, respectively. A t test indicated that the mean Inconsistency Scale scores for the low education group was significantly higher than for the high education group, t (68) = 2.58, $p < .01$. Thus these results tend to support the hypothesis that the high education group exhibited greater consistency in their responding than the low education group.

Discussion

The results of these two studies support the existing evidence that caregivers are capable of providing accurate information about the developmental status of their children. As evinced by the data, in most instances caregivers responded in a consistent manner to the KID Scale items. It is believed, however, that the Inconsistency Scale will be a method to detect those few caregivers who, for various reasons, are not consistent in their responses to KID Scale items. Additionally, since the Inconsistency Scale is embedded in the KID Scale, it is unlikely that caregivers will be aware that the inconsistency of their responses is being measured.

At present, scoring of the Inconsistency Scale will be incorporated into the computer scoring for the KID Scale. Currently, it is being recommended to clinicians that an Inconsistency Scale score of three or more would warrant further investigation, since in both studies at least 80% of the caregivers obtained an Inconsistency Scale score of a two or less. It is believed that before making recommendations or designing habilitation programs for the child, the Inconsistency Scale will be a means by which the validity of the caregiver report can be confirmed.

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Footnotes

These studies were completed as part of an undergraduate individual investigation under the supervision of Dr. Jeanette Reuter, Department of Psychology, Kent State University, Kent, Ohio, 44242. Requests for more detailed data summaries or a copy of the total Inconsistency Scale can be sent for at this address.

The Concurrent Validity of the *KID Scale* with the *Bayley Scales of Infant Development* for the Developmental Assessment of Severely and Profoundly Handicapped Children.

Terry Stancin, M.A. Thesis

STANCIN, TERRY, M.A., December, 1981 PSYCHOLOGY

THE CONCURRENT VALIDITY OF THE KID SCALE WITH THE BAYLEY SCALES FOR THE DEVELOPMENTAL ASSESSMENT OF SEVERELY AND PROFOUNDLY HANDICAPPED CHILDREN (85 pages)

Director of Thesis: Jeanette Reuter

Infant tests, such as the Bayley Scales of Infant Development (BSID), are used to assess the developmental status of severely handicapped young children because they tap behaviors at the lowest levels of developmental functioning. However, the reliability and validity of infant tests for use with severely handicapped children have not been demonstrated. The research reported in this thesis is part of a project to adapt a caregiver-based infant test, the KID Scale, for use with severely handicapped young children.

Caregiver-completed KID Scales and professionally administered BSID's were obtained in five geographic regions for 106 severely and profoundly handicapped young children. The informants completing KID Scales were mothers, professionals (e.g., teachers), and nonprofessionals (child care aides and teacher's aides).

Since the results from the geographic regions did not differ in terms of validity coefficients samples were combined for all five groups. KID Scale full scale

and domain raw scores were correlated with the BSID mental development, psychomotor development, and domain raw scores obtained from the Kent Scoring Adaptation of the BSID.

The validity coefficients were examined for the total sample and by groups defined by the relationship of the KID Scale informant to the child (i.e., mothers, professionals and nonprofessionals). Scores were significantly and highly correlated in most domains ($r > .80$) regardless of type of informant. Relatively lower correlations were obtained in language and social domains, while the motor areas demonstrated the highest coefficients.

Developmental age estimates derived from the KID Scales were about one month higher than those obtained from the BSID, except in maternal KID Scale reports, which were about two months higher. The discrepancies, while of no practical significance, are discussed in terms of properties of the tests and implications for KID Scale interpretations depending on the caregiver-informant.

These data suggest the KID Scale yields developmental assessment information that is very similar to that obtained from the BSID. Considering the cost of a professionally administered psychological test and the benefits obtained from using a caregiver based inventory, the use of the KID Scale to assess the developmental level of severely handicapped children not only appears to be valid, but may have greater utility as well.

THE CONCURRENT VALIDITY OF THE KID SCALE WITH THE BAYLEY SCALES FOR THE DEVELOPMENTAL ASSESSMENT OF SEVERELY AND PROFOUNDLY HANDICAPPED CHILDREN

A thesis submitted to the
Kent State University Graduate College
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by

Terry Stancin

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Thesis written by

Terry Stancin

B.A., Hiram College, 1979

M.A., Kent State University, 1981

Approved by

____, Adviser

______________________, Chairman, Department of Psychology

Accepted by

__________________________________, Dean, Graduate College

70

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Table of Contents

Page

Chapter I

Introduction 1

Caregiver Reports 5

The Bayley Scales of Infant Development 14

The Kent Infant Development Scale (KID Scale) . 19

Assessment of Validity 23

Chapter II

Method 25

Subjects 25

Children 26

Caregivers 28

Procedure 33

Data Analyses 33

Chapter III

Results 37

Chapter IV

Discussion 53

Validity Coefficients 54

Developmental Age Estimates 55

Conclusions 59

Page

Appendix A 61

Appendix B (Tables) 65

References 77

List of Tables

Table 1 - Child Demographic Variables
Table 2 - Caregiver Types in the Five Geographic Samples
Table 3 - Amount of Time Spent Caring for the Child in Months by Sample and by Caregiver Relationship
Table 4 - Caregiver Education in Years by Sample and by Caregiver Relationship
Table 5 - Validity Coefficients by Geographic Sample
Table 6 - BSID and KID Scale Validity Coefficients, Georgia Sample
Table 7 - Mean Developmental Age Estimates in Months, Georgia Sample
Table 8 - BSID and KID Scale Validity Coefficients, Florida Sample
Table 9 - Mean Developmental Age Estimates in Months, Florida Sample
Table 10 - BSID and KID Scale Validity Coefficients, California Sample
Table 11 - Mean Developmental Age Estimates in Months, California Sample
Table 12 - BSID and KID Scale Validity Coefficients, Massachusetts Sample

Table 13 - Mean Developmental Age Estimates in Months, Massachusetts Sample

Table 14 - BSID and KID Scale Validity Coefficients, Ohio Sample

Table 15 - Mean Developmental Age Estimates in Months, Ohio Sample

Table 16 - Test/Retest KID Scale Reliability Coefficients by Domain - Total Sample

Table 17 - Mean Developmental Ages in Months for Test/Retest KID Scales - Total Sample

Table 18 - Concurrent Validity Coefficients for the KID Scale and the BSID - Total Sample

Table 19 - Mean Developmental Age Estimates from the KID Scale and the BSID in Months - Total Sample

Table 20 - BSID and KID Scale Validity Coefficients, Mothers Sample

Table 21 - Mean Developmental Age Estimates in Months, Mothers Sample

Table 22 - BSID and KID Scale Validity Coefficients, Professionals Sample

Table 23 - Mean Developmental Age Estimates in Months, Professionals Sample

Table 24 - BSID and KID Scale Validity Coefficients, Nonprofessionals Sample

Table 25 - Mean Developmental Age Estimates in Months, Nonprofessionals Sample

Table 26 - BSID and KID Scale Validity Coefficients by Caregiver

CHAPTER I

Introduction

Infant tests have been used to assess the developmental status and progress of young severely handicapped children. Infant tests have been used to evaluate the effectiveness of programs for the education and habilitation of handicapped children (Berkson & Landesman-Dwyer, 1977; Stedman & Eichorn, 1964), and for individual clinical assessments (Bayley, 1969; Crebo, 1976, Grossman, 1973; Haskett & Bell, 1978; Hunt & Bayley, 1971; Malone & Christian, 1975), as well as for answering research questions about the development of handicapped children (Durham & Black, 1978; Ireton, Thwing, & Gravem, 1970; Sherunian & Broman, 1975; Werner, Honzig & Smith, 1968). Katoff and Reuter (1979) compiled a comprehensive listing of infant developmental tests that are available for these uses with infants and severely handicapped children.

In general, infant tests have been criticized because they have not been able to predict later intelligence test scores of normal infants (Hunt & Bayley, 1971; McCall, Hogarty, & Hurlburt, 1972). However, predictive relationships are significant for handicapped children

78

(Erickson, Johnson, & Campbell, 1970; Honzik, Hutchings, & Burnip, 1965; Ireton, et al., 1970; Knobloch & Pasamanick, 1963; VanderVeer & Schweid, 1974; Werner, et al., 1968). These authors found that low scores on the infant tests they used, in their cases, the Bayley Scales of Infant Development (BSID) (Bayley, 1969), the Gesell Scales (Gesell, 1925), and the Cattell Infant Intelligence Scale (Cattell, 1940), were more predictive of later intelligence test scores than normal or high scores. Tests of infant abilities may have more predictive validity when used with developmentally delayed children than when used with average infants.

Among the infant tests which have been used on young handicapped children are the BSID, the Gesell Scales, the Uzgiris-Hunt Ordinal Scales (Uzgiris & Hunt, 1975), and the Cattell Infant Intelligence Scale. The use of infant tests to measure the development of handicapped children who clearly differ from healthy infants in chronological age, health status, and often rearing milieu is based on the similarity of their behavioral repertoires. Young severely handicapped children are acquiring and practicing many of the same behaviors that infants are. They lack many fine and gross motor abilities, have only rudimentary language and social skills, and have limited cognitive capacities. They, like infants, require constant assistance and depend on their caregivers to attend to their feeding, toileting, dressing and comfort needs.

However, there are important differences between a six month old infant and a brain damaged eight year old whose developmental age (DA) is six months. Berkson and Landesman-Dwyer (1977) reviewed twenty years of research on this population of handicapped individuals. They were unable to resolve the deficit versus difference controversy about severely handicapped people; that is, the question of whether they are a qualitatively distinct group or merely have a slower rate of development than other populations. The answer to this question would have consequences for the developmental assessment of these individuals.

Despite the fact that infant tests were not developed specifically for this population, and that severely and profoundly handicapped children may be characteristically different from normal infants, these tests continue to be used to assess the functioning of handicapped children. The tests are assumed to be psychometrically appropriate although research data to support their use with severely handicapped children is lacking. In addition, little information beyond one or two developmental indices can be derived from most infant tests, limiting their usefulness in educational and habilitation program planning.

What is needed is a clinically useful, reliable and valid measure for assessing the developmental status and progress of young severely handicapped children. This thesis is part of a federally funded research project to adapt a caregiver-informant infant behavior measure, the Kent Infant Development Scale, or KID Scale (Katoff, Reuter, & Dunn, 1980), to evaluate handicapped children. The present research is designed to answer the following questions:

(1) What is the relationship between the performance of severely handicapped young children on the KID Scale and the BSID?

(2) Are KID Scale developmental age estimates similar to those obtained from the BSID?

(3) What factors account for differences between the developmental age estimates derived from the two tests and the level of the validity coefficients?

A discussion of several topics relevant to this research follows. First, the use of caregiver reports as sources of developmental information on handicapped children is reviewed. Then, the development of the BSID and its use in assessing normal infants and handicapped children are described. Next, is a description of the KID Scale and its potential utility for assessing the developmental status and progress of handicapped children. Finally, the general issue of assessing test validity is addressed.

Caregiver Reports

One of the major problems in evaluating the outcomes of early educational and environmental interventions with handicapped children is valid assessment (Bronfenbrenner, 1975; Simeonson, Huntington, & Parse, in press). Most tests used to assess the status of severely and profoundly handicapped children must be administered by a professionally trained diagnostician. Thorough training is necessary to administer, score, and interpret the tests in the manner in which they were designed (Bayley, 1969). This poses cost as well as validity problems for these measures. Recently, however, alternative individuals, including direct-caregivers, have been used as sources for developmental assessment data with both normal and handicapped children (Colligan, 1976; Frankel, 1979; Knobloch, Stevens, Malone, Ellison & Resemberg, 1979; Thompson, Currey & Yance, 1979).

There are several advantages to using a caregiver-completed inventory instead of a professionally administered test. First, caregivers are an important and often untapped source of data. This is particularly true in the case of children with limited behavioral competencies. A direct-care provider has more opportunities to observe a wider array of existing behaviors than does a professional who is able to spend only an hour or so observing a child.

Therefore, the ecological validity of evaluations of handicapped children can be maximized by gathering data from individuals who know the child well (Irvin, Crowell, & Bellamy, 1979; Thompson, 1979).

Secondly, a caregiver-completed inventory is much more economical than is a professionally administered test. A developmental assessment that includes a BSID administration and report is costly because of the amount of expensive professional time involved. Once an assessment device has become available the major expense involved is the amount of professional time required for its use. A caregiver-based test takes very little professional time. With a reduction in costs, more frequent assessments would become possible, facilitating treatment planning and programming.

A third advantage of caregiver reports is that they involve caregivers in the earliest phase of treatment (Bronfenbrenner, 1975; Tjossem, 1976). Successful intervention with handicapped young children depends on caregiver involvement in all phases of treatment, particularly in early planning stages, including assessment (Boll, 1972; Bricker & Dow, 1980; Shoemaker & Reid, 1980; Stedman, 1977). Parents, for example, are much more amenable to educational programming when they have contributed to their child's assessment (Stedman, 1977). Involving caregivers, therefore, contributes significantly to the prescriptive utility of a test. Professionally administered tests afford little opportunity for such direct involvement.

There are, however, shortcomings to caregiver-based tests. Specifically, the reliability and validity of caregiver information has yet to be established. One of the first empirical studies of caregivers' estimations of their retarded children's mental developments was done by Ewert and Green (1957). The subjects were one hundred mentally retarded children for whom some IQ estimate was available (from either the Vineland Social Maturity Scale, the Cattell Infant Intelligence Scale, the Stanford-Binet, or the WISC). Mothers were asked to estimate their child's developmental age and a simple ratio IQ (DA/CA x 100) was computed on their estimates. These maternal IQ estimates were compared to the "true" IQ's obtained from the professionally administered tests. The estimated IQ was designated as "accurate" if it fell within fifteen points of the true IQ, and "erroneous" if it differed by more than fifteen points. Ewert and Green found that younger, better educated mothers from higher occupational levels were the most accurate, and that estimates of boys' IQ's were more accurate (70% accurate estimates) than estimates of girls' IQ's (57% accurate estimates). Although this study has many methodological flaws (such as different measures of

IQ treated as the same and the arbitrary designation of "accurate" and "erroneous" estimates), it represents an early attempt at examining maternal reports of developmental status, and provides data that suggests that mothers can be fairly accurate judges of the developmental level of their retarded children. In addition, Ewert and Green began to identify some characteristics of valid and invalid informants.

More recent studies dealing with parent reports of handicapped children have yielded similar results. Most studies are in agreement that caregivers can be accurate and reliable observers of their child's behavior and developmental functioning if the data furnished are not retrospective or subjective. Mothers, however, tend to judge the development of their child to be higher than do professional or paraprofessional caregiver informants. In almost all of the studies that will be discussed, caregivers were asked to make predictions or estimations about their child's performance. It may be more fruitful, both in terms of report accuracy and benefits to caregiver education, to ask them to observe and record their child's daily behaviors rather than make estimates of developmental status.

Capobianco and Knox (1964) asked both mothers and fathers to provide assessment information on their retarded children. These parents were independently trained to complete a modified Stanford-Binet (L) on their child which involved an interviewer reading to the parents the Stanford-Binet items which would be presented to the child. The parents were asked to decide whether or not they believed their child would be able to do each task. The child was subsequently administered the Stanford-Binet by a trained examiner. The results suggested that mothers, but not fathers, "overestimated" their child's performance. The fathers' assessments did not differ significantly from the actual professional assessments. The authors concluded that since the fathers lacked the "continuous contact" that mothers had with their children, fathers could be more objective than could the mothers, even though mothers were able to observe more varied behaviors in their daily contacts with the children. An alternative explanation may be that the children would have performed more items for their mothers who were, indeed, objective estimators. Studies comparing parent reports to teacher ratings on the Vineland Social Maturity Scale (Doll, 1947) also found that mothers rated their children significantly higher than did the teachers (Cole, 1976; Kaplan & Alatishe, 1976).

Hanson, Vail and Irvin (1979) had the mother of eleven Down's Syndrome infants and a trained observer each complete a behavior checklist on the handicapped children. BSID's were administered to these infants, and the average percent agreements were computed on items common to the checklist and the BSID. The percent agreements were sufficiently high, particularly on motor items. These items, of course, are the most readily observable behaviors. In addition, the children's relative developmental status, as assessed by different informants, was similar.

Field, Hallock, Dempsey, and Shuman (1978) examined the reliability and validity of maternal assessments of their neonates. Mothers completed an adapted Neonatal Behavioral Assessment Scale (Brazelton, 1973) during an interview, and clinicians administered a standardized Neonatal Behavioral Assessment Scale to forty neonates born with respiratory distress syndrome. The BSID was then administered to these infants when they were eight months old. Although the early assessments completed by the mothers and the clinicians both correlated significantly with the BSID motor scale, no other correlation was significant. However, the authors' conclusion that mothers' observations on very young infants could be objective and reliable and have predictive validity gives credibility to maternal reports.

Gradel (1979) compared mother, teacher, and professional reports on infants identified as developmentally delayed or at-risk. The subjects were 30 mildly to severely disabled infants between the ages of three and 24 months. Their mothers completed a modified BSID (Bayley Maternal Interview) and the Alpern-Boll Developmental Profile (Alpern & Boll, 1972). Teachers completed an Alpern-Boll Developmental Profile, and a BSID was professionally administered. Mothers' ratings on the Bayley Maternal Interview were compared to the professional's BSID assessments. The mothers' Alpern-Boll responses were compared to those of the teachers. The mothers' interview BSID scores were highly correlated with the professional's BSID scores ($r = .686$ for the mental scale and $r = .666$ for the motor scale), and were moderately correlated with the teachers' Alpern-Boll Developmental Profile ratings ($r = .415$). On both instruments mothers estimated their infants' performances to be at a higher level than did the professional and the teachers. This was true both for item-by-item agreements and for total scores. However, the developmental age estimates for the children by the professional based on the BSID mental scale score did not differ significantly from the teachers' estimates based on the Alpern-Boll.

Thompson (1979) reported a very similar study with 90 retarded preschool children. A psychometrician administered the McCarthy Scales of Children's Abilities (McCarthy,

1972) to the children and their teachers completed an Alpern-Boll Developmental Profile. Mothers were asked to predict their child's responses on the McCarthy Maternal Interview and the Alpern-Boll as in the Gradel study. The diagnostician and mothers agreed on 78% of the McCarthy items, and overall McCarthy general cognitive indices (GCI) and Alpern-Boll scaled scores correlated highly across informants. However, again mothers' estimates of developmental age were significantly higher than teachers' and the diagnostician's estimates.

The reliability of caregiver information provided on an instrument by different informant pairs was reported by Dunn, Stancin, and Reuter (1981). They compared "professional" (such as nurses and teachers) and "nonprofessional" (childcare aides) KID Scale reports for 154 institutionalized children who were severely and profoundly retarded. Two kinds of interjudge reliability estimates were obtained. The first was based on the total number of items endorsed by each caregiver in the pair. Correlation coefficients across KID Scale domains were all high ($r = .67$ to $.98$). The other interjudge reliability estimate was based on caregiver agreement on items. Mean percent agreements across domains were also high ($\overline{X} = 76\%$ to 91%). Both types of reliability estimates were especially high when two professionals were reporting on the child.

These studies all suggest that, while caregivers may be very reliable and accurate reporters of developmental assessment data on handicapped children, there may be some differences between their observations and those of a clinician. Professionals who know a child well, such as a teacher, may report developmental information that is very similar to that of a diagnostician who administers a standardized instrument (Gradel, 1979; Thompson, 1979). Maternal reports, on the other hand, seem to yield higher developmental age estimates than do diagnostician or other caregiver reports.

In general, there were three approaches taken in the research cited on caregiver reports of the development of handicapped children. In the first approach, caregivers were asked to guess the global developmental level of their child. This estimate was then compared to a score obtained from a standardized instrument. Another approach involved asking caregivers to make predictions about their child's performance on a professionally administered test. Then these predictions were compared with the child's actual performance on that test. In the third approach caregivers were given an assessment inventory, and those results were compared with information obtained from another caregiver's report on that same inventory. None of the studies cited compared caregiver-based developmental assessment instrument results with professionally administered test results.

The Bayley Scales of Infant Development

The Bayley Scales of Infant Development (BSID) is a professionally administered diagnostic instrument used to assess the developmental status of healthy infants under the age of thirty months (Bayley, 1969). The BSID was originally designed to provide measures of infant development for use with the Berkeley Growth Study, a longitudinal developmental study that began in 1928 (Hunt & Bayley, 1971). A "mental scale" of 163 items purports to assess perception, memory, imitation, adaptation, problem solving, social responsiveness, and vocalization. A "motor scale" contains 81 fine and gross motor development items. An "infant behavior record" contains ratings of infant traits and behaviors observed by the diagnostician during the assessment session (Bayley, 1969). The mental and motor scales were first standardized on 61 original Berkeley infants in three parts: the "California First Year Mental Scale" (Bayley, 1933), the "California Preschool Mental Scale" (Jaffa, 1934), and the "California Infant Scale of Motor Development" (Bayley, 1935). These tests were administered to the original sample at monthly intervals from birth to 15 months of age. The infant behavior record was also a result of this longitudinal study (Bayley & Schaefer, 1964).

The standardization sample for the current form of the BSID was comprised of 1262 children who ranged in age from two to 30 months (Bayley, 1969). Items were arranged in order of age placement determined by the preliminary studies. The age at which 50% of the children passed the item was designated as the item age-norm. A developmental index (DI) and developmental age (DA) equivalent can be derived from the scaled raw scores for both the mental and motor scales. The DI has a mean of 100 and a standard deviation of 16 and can be useful in comparing the development of an infant with the performance of his or her age peers. However, a DI cannot be tabled for a child who is older than thirty months or whose DI would be lower than 50. Thus, for older handicapped children, a DA is most useful since it approximates the developmental age at which a child is functioning.

Like other infant tests used in the assessment of handicapped children, the BSID has not been adapted for use with disabled populations. Clinical uses of the BSID with handicapped children usually involve converting raw scores into DA equivalents for the two scales. Although the BSID is the most frequently used test for assessing severely and profoundly handicapped children, Bayley does not currently recommend it for individuals who score more than three standard deviations below the mean (Grossman, 1973). Grossman suggests that profoundly retarded children who are able to respond to only very gross stimuli are untestable. According to Haskett and Bell (1978), a single BSID administration may underestimate the competence of retarded children since the samples of these children's behaviors obtained during a BSID administration may not be representative of their behavioral repertoires. That is, a single test administration may not allow sufficient opportunities for a handicapped child to demonstrate its behavioral competencies.

While it is true that, in general, standardized tests do not purport to optimize an examinee's performance, Bayley's standardization instructions (Bayley, 1969) call for eliciting responses in any manner within the specified item guidelines. She recommends that every attempt be made to obtain the required response from the child, as long as individual item instructions are not altered. Therefore, if a single BSID administration cannot adequately sample a handicapped child's behavioral repertoire, a second appointment may be necessary to yield an appropriate indication of the child's developmental status.

Attempts at establishing subscales of the BSID have been criticized (Bayley, 1969; 1970; Hunt & Bayley, 1971).

Factor analytic techniques that have been applied to the BSID (Bayley, 1970; Hofstaetter, 1954; McCall, Eichorn, & Hogarty, 1977; Stott & Ball, 1963) and scalogram analyses (Kohen-Raz, 1967) have largely been unsuccessful in creating subscales. There have been few independent factors emerging and only a few of the BSID items loaded on any of the factors. Bayley (1969) claims this is because abilities

> do not array themselves into neat concurrently developing "factors" of mental or motor functions . . . any classification of abilities into parallel arrays purporting to designate different factors that develop concurrently is artificial and serves no useful purpose. Subscales may be developed for clusters of interrelated items, but these scales are usually limited to short age spans (pp. 2-3).

Thus there have not been any attempts to systematically examine subscales of the BSID when used with handicapped children. Handicapped children do not necessarily develop in even sequences across behavioral areas. Cerebral palsied children, for example, often demonstrate much lower fine motor capabilities in relation to their cognitive functioning. Therefore, one DA estimate that summarizes the entire mental scale may not yield enough useful information for diagnosis or program planning. DA estimates for specific behavioral domains may have greater utility.

The Kent Scoring Adaptation of the BSID (Reuter, Stancin & Craig, 1981) permits finer distinctions within the mental and motor scales (see Appendix A). Here, on a face validity (item content) basis, the BSID items were placed in cognitive, language, social, fine motor, and gross motor domains and were arranged by their item age-norms (Bayley, 1969). Overlap exists between domains and a few items appear in more than one domain. Developmental age estimates that were derived from the item age-norms of the BSID mental and motor scales can be derived for each domain. The BSID is first administered and scored according to the standardization instructions (Bayley, 1969). Then, the subscale scores are computed according to the Adaptation's scoring directions. The total number (n) of items passed in a domain is computed with the items age-norm of the nth item representing the DA for that domain. The Kent Scoring Adaptation has demonstrated clinical utility among clinicians who have used it to categorize their observations when assessing handicapped children. However, its psychometric properties have not been established. The Kent Scoring Adaptation of the BSID as well as the full BSID results will be used in the studies reported.

The Kent Infant Development Scale (KID Scale)

The KID Scale is a caregiver-completed inventory consisting of 252 items describing behaviors characteristic of the first year of life in normal healthy infants (Katoff, et al., 1980). These behaviors are grouped into five domains based on item content: cognitive, motor, language, self-help, and social. In addition, it is possible to get a full scale score which contains the results of all of the domain items. Each item has a corresponding age-norm that was derived from a sample of 357 presumed healthy infants (Katoff, 1977; Katoff, et al., 1980). As with the BSID, items are ordered by their age placements. However, instead of establishing norms based on the age at which 50% of the children passed a given item, a 65% passing designation was used as the norming criteria. Test-retest and interjudge reliability estimates of both domain and full scale scores were high (all coefficients greater than .85) for the norming sample.

Concurrent validity of the KID Scale was estimated by administering the BSID to 38 infants in the norming sample. The twenty males and 18 females ranged in age from three months to 13 months (mean = 8.3 months). BSID developmental age scores for the mental and motor scales were calculated to the tenth of the month. A combined BSID score was obtained by averaging the mental and motor scale scores. Then the BSID developmental ages and the KID Scale developmental ages were correlated for the domains and the full scale. Pearson product-moment correlations for the 38 infants were high (all r's $>$ .84). The correlation coefficient for the KID Scale full scale and the BSID mental scale was .88; with the BSID motor scale it was .90, and with the combined BSID it was .92. Thus, developmental ages estimated from the total KID Scale and BSID were similar.

To complete the KID Scale a caregiver reads each of the 252 items printed in the test booklet and grids in the appropriate response on the computer-scorable answer sheet. The items are written at a fourth grade reading level and represent observable behaviors designed to be all-inclusive of an infant's repertoire. There are four possible answers to each item stem:

A - Yes
B - Used to do it, but outgrew it
C - Is no longer able to do it
D - No, cannot do it yet

The answer sheets are computer scored and a printout is created for each child. The printout lists each item in a domain in order of its age norm, and records the responses endorsed by the informant. This information can be useful for designing individual program plans because the sequences and patterns of a child's strengths and deficits are concretely described (Reuter, Katoff, & Dunn, 1981). Estimates of developmental age can be derived for each domain and for the full scale based on the number (n) of domain items endorsed by the caregiver. The age norm of the nth item is designated as the child's DA for that domain.

Although the KID Scale is currently used to assess the developmental status and progress of normal infants and infants at-risk for future developmental delays, it has a promising potential for assessing handicapped young children who function developmentally at an infant level. First, it uses caregiver-based information, the value of which was previously discussed. Secondly, it is an inventory consisting of current behaviors. The caregiver does not need to make predictions nor recall prior activities in which the child might have engaged. An informant is not required, for example, to recall the age at which the child first "sat alone," but simply indicates whether the child currently can. Therefore, the accuracy problems associated with using retrospective data from caregivers, which have created problems for other investigators (Saxon, 1975; Yarrow, Campbell & Burton, 1970), are not an issue. A third asset of the KID Scale is its simplicity. The items require a low-level reading ability and the test takes less than an hour to complete. Parents and other direct-care providers find it an easy, uncomplicated instrument. Finally, it has been developed through sound psychometric research relating to its use with healthy infants. Experience with its clinical use with severely and profoundly handicapped young children will be empirically documented when the research program of which this current study is a part is completed.

There are some limitations to the current form of the KID Scale for use with severely and profoundly handicapped children. It does not describe all the important observable behaviors characteristic of young severely handicapped children who are developmentally under one year of age. Those behaviors not included are of a pathological nature, such as self-stimulation and self-mutilation, handicapping paralyses and incoordinations, sensory deficits, feeding problems, and specific medical needs. Some of the items are expressed in inappropriately infantile terminology. In addition, it has not been established that the order of acquisition of developmental milestones is similar for infants and handicapped children of similar developmental ages. Therefore, the KID Scale may need to be altered if it is to adequately describe the behaviors and development of handicapped children. This research on KID Scale concurrent validity should yield some of the empirical data necessary for such an adaptation.

Assessment of Validity

According to Nunnally (1978) the validation of an instrument is an ongoing, unending process involving the interrelationships between measures.

> Validity is a matter of degree rather than an all-or-none property . . . one validates not a measuring instrument but rather some use to which the instrument is put (p. 87).

Concurrent validity establishes the generalizability of scores on one variable to scores on another, and

> is determined by, and only by, the degree of correspondence between two measures involved. If the correlation is high, no other standards are necessary (p. 88).

However, computing correlation coefficients alone do not make a test a valid instrument. Messick (1980) suggests that the only kind of validity is construct validity.

> Concurrent correlations with criteria are usually obtained either to appraise the diagnostic effectiveness of the test in detecting current behavioral patterns or to assess the suitability of substituting the test for a longer, more cumbersome one, or more expensive measure (p. 1017).

A useful way of approaching this task would be to address the "function of the relationship in terms of utility rather than validity" (p. 1017).

The research reported here was conducted with this approach in mind. The KID Scale's validity is not simply being determined by its correlation with the BSID. Rather, the appropriateness, adequacy, and consequences of the KID Scale assessment of severely and profoundly retarded children are being addressed in the broader framework of utility. The detailed knowledge a caregiver has about a child's behavioral repertoire from his or her daily contact with the child is considered valuable and should be a part of the assessment data for the habilitation planning for the handicapped child. The KID Scale is an effort to structure the gathering of that data to maximize its reliability and validity.

The use of caregiver reports can involve the caregiver in the program planning of a child from its inception. Perhaps the caregiver's evaluation may eventually reduce or replace some of the expensive professional evaluations. If so, such a contribution would have social utility.

CHAPTER II

Method

Subjects

Field workers who gathered the data on the children and their caregivers, except for the Ohio sample, were psychometric consultants contracted for on a federal grant under the direction of Dr. Jeanette Reuter, Professor of Psychology, at Kent State University. Data for the Ohio sample were collected by the Kent State University home office staff. These field workers located subjects, obtained proper consents and permissions from parents and guardians, and collected the necessary data according to protocols from the original grant proposal.

One hundred and six severely or profoundly handicapped young children from five geographic locations (Georgia, Florida, California, Massachusettes, and Ohio) served as subjects for the following studies. The subjects were either diagnosed as severely or profoundly retarded based on a standardized psychological test administration (IQ < 35) or were multiply handicapped young children under the age of nine who were largely nonambulatory and nonverbal.

Children

Each child had two caregivers who knew that child well. Although some caregivers may have reported on more than one child in the total data pool, a single, unique caregiver was chosen for each subject for the following concurrent validity studies. Each child and associated caregiver formed an independent data dyad.

The children were between 18 and 108 months of age (mean = 60.9 months, S.D. = 21.8). Some were institutionalized, some lived with their parents or foster parents, and some lived in group homes. Their specific diagnoses included mental retardation, epilepsy, hydrocephaly, cerebral palsy and genetic syndromes resulting from prenatal or perinatal insults, cerebral malformations, encephalopathy following trauma or disease. Most of the children had multiple disabilities. Since chronological age and sex account for so little of the variance in the developmental level of this population (Reuter, Archer, Dunn & White, 1980), the subjects were treated as a homogeneous group with respect to age and sex.

Table 1 contains descriptive statistics on several demographic variables on the subjects in the five samples. As can be seen in Table 1, the samples vary somewhat in size, gender ratio, place of residence, caregiver type and

Table 1

Child Demographic Variables in the Five Geographic Samples

	Geographic Sample					
	GA.	FL.	CA.	MA.	OH.	Total
n	15	22	21	22	26	106
Mean chronological age*	59.0	61.4	50.2	70.6	62.0	60.9
Number of males	9	13	14	9	16	61 (58%)
Number of females	6	9	7	13	10	45 (42%)
Mean BSID mental DA*	6.0	6.0	5.7	5.2	3.8	5.3

*in months

developmental level. No claim is made that these 106 children are representative of severely handicapped children in the United States on any of these attributes.

Caregivers

Since reliability sets an upper limit on the validity of a test (Nunnally, 1978), the criteria for selecting which caregiver's KID Scale would be compared with the child's BSID was based on the test-retest reliability of the individual caregivers. That is, the most reliable caregiver of two available for each child was selected for the study in order to derive optimal concurrent validities.

As previously mentioned two caregivers provided developmental information for each child in the pool. Each caregiver completed two KID Scales on their child in about a two week interval. For each subject the more reliable of the two caregiver informants was chosen for the study. This decision was based on the differences between the total KID Scale score on the two administrations by each caregiver. The informant having the smaller absolute full scale score difference between the test and the retest was designated as "more reliable" than the other. An exception to this selection guideline occurred when the more reliable caregiver in a pair was also the more reliable for another child. In these cases the less reliable caregiver was chosen, providing that the difference between the test-retest raw scores was less than ten points. If the difference was greater, the case was dropped. The mean differences between the full scale raw scores for this sample of "most reliable" KID Scales was 3.2 points (S.D. = 8.9). This resulted in a sample of caregivers whose KID Scale retest reliability coefficient was .99.

The caregivers were all direct-care providers who were relatives (parents or grandparents), professionals (teachers, physical therapists, nurses or ward supervisors) or nonprofessionals (child care aides or teacher aides). Table 2 gives the frequencies of the types of informants in the five area samples. The majority of informants were either mothers (33%), teachers (28%), or child care aides (24%). Information with respect to length of time the caregiver spent caring for the child and the caregiver educational attainments are presented in Tables 3 and 4. On the average, caregivers reporting on the children had cared for them for about two years (mean = 25.5 months, S.D. = 25.2). The Georgia, Florida, and California samples which had a high proportion of mother caregivers had the longest average time of caring for the child they were reporting on. The mean educational level was 14.2 years (S.D. = 2.5) and was highest for the California and Massachusettes samples. Practically all of the informants

Table 2

Caregiver Types in the Five

Geographic Samples[a]

	Geographic Sample					
Informant Type	GA.	FL.	CA.	MA.	OH.	Total
Mothers	7	13	11	4	0	35 (33%)
Grandparents	1	0	0	0	0	1 (1%)
Child Care Aides	0	2	0	4	19	25 (24%)
Teacher Aides	4	0	0	0	0	4 (4%)
Teachers	3	7	8	9	3	30 (28%)
Nurses	0	0	0	4	2	6 (6%)
Phys/Occup Therapists	0	0	2	1	1	4 (4%)
Ward Supervisors	0	0	0	0	1	1 (1%)

[a] Numbers reported are frequencies

Table 3

Amount of Time Spent Caring for the Child in Months by Sample and by Caregiver Relationship

	Geographic Sample					
	GA.	FL.	CA.	MA.	OH.	Total
Mean	33.3	38.5	30.1	18.9	11.7	25.5
Median	24.3	25.5	26.0	9.5	11.5	14.5
S.D.	27.6	32.5	21.7	22.0	11.0	25.2
Range	2-86	3-96	2-81	2-75	2-46	2-96

	Caregiver Relationship		
	Mothers	Profess.	Nonprofess.
Mean	55.7	9.4	12.3
Median	53.3	7.0	11.6
S.D.	19.8	7.6	10.6
Range	25-96	2-30	2-46

Table 4

Caregiver Education in Years by Sample and by Caregiver Relationship

	Geographic Sample					
	GA.	FL.	CA.	MA.	OH.	Total
Mean	12.5	13.7	15.4	15.5	13.6	14.2
Median	12.1	13.5	15.9	15.9	12.4	13.8
S.D.	1.5	2.4	2.7	2.1	2.1	2.5
Range	10-16	9-17	11-20	12-19	12-19	9-20

	Caregiver Relationship		
	Mothers	Profess.	Nonprofess.
Mean	13.0	16.2	12.7
Median	12.4	16.1	12.2
S.D.	2.4	1.6	1.3
Range	9-19	13-20	12-16

were female (99%).

Procedure

Caregivers were asked to complete two KID Scales on each subject. During the two week interval between these reports the BSID was administered to the child by trained, experienced psychometricians. Standardized instructions were followed as closely as possible considering the handicaps of the children. The BSID data were then scored according to the Kent Scoring Adaptation of the BSID. Raw scores and developmental age estimates for the Kent Scoring Adaptation domains and BSID mental and motor scales were recorded. Of the two KID Scales each "most reliable" informant completed on a child, the second was chosen for comparison with the BSID results. This decision ensured that the caregiver had administered at least one prior KID Scale. The assumption is that more experience in using the instrument would improve the accuracy of the observation and the report.

Data Analyses

Since the samples from the five geographic areas did differ somewhat from each other, including caregiver characteristics, subject characteristics, and the individuals administering the BSID's, the validity coefficients and developmental age estimates from each geographic sample as well as the total sample were examined. The relationship between the KID Scale and the BSID was assessed first by correlating the raw scores of the KID Scale domains and full scale with the raw scores of the Kent Scoring Adaptation domain scales and the mental and motor scales of the BSID. Developmental age estimates for the two tests were then compared.

Next, the test-retest reliability and concurrent validity of the KID Scale were examined using all 106 subjects and their most reliable caregivers. The test-retest reliability was assessed by comparing each caregiver's two KID Scales. The five domains and the full scale raw scores in the first report were correlated with their corresponding scores in the second report. In addition, the mean developmental ages derived from each domain and full scale for the two KID Scales were examined. Then the BSID and KID Scale raw scores were correlated across domains and developmental age estimates were compared.

Finally, the validity coefficients and developmental age estimates were examined for each type of informant: i.e., mothers, professionals, and nonprofessionals. No attempt was made to define these groups on any subject variables (e.g., educational attainment) except in terms of the nature of their relationship and contact with the child on whom they reported.

The "mothers" sample consisted of 35 mothers whose handicapped children were from 25 to 96 months old (mean = 55.7, S.D. = 3.4). The mothers had 9 to 19 years of education (mean = 13.0, S.D. = 2.4).

The "professionals" sample was comprised of 30 teachers, 6 nurses, and a ward manager. Physical and occupational therapists were not included in this group since their caregiving of a child is limited both in time and in type of activities. The professionals had 13 to 20 years of education (mean = 16.2, S.D. = 1.6) and had known the child on whom they were reporting from 2 to 30 months (mean = 9.4, S.D. = 7.6). The reason the range of education for this group includes individuals with little education beyond high school is that in two of the samples (Georgia and Florida) teachers of handicapped children do not need to have college degrees and practical nurses (LPN's) were classified as nurses. Both teachers and LPN's had aides working under them.

The "nonprofessionals" were 25 child care aides and 4 teacher aides who typically had little, if any, relevant vocational training beyond high school. They had 12 to 16 years of education (mean = 12.7, S.D. = 1.3) and had cared for the children on whom they were reporting for 2 to

46 months (mean = 12.3, S.D. = 10.6).

As would be expected, mothers had been caring for their children longer than the other two types of caregivers. Nonprofessionals and mothers had similar educational levels (typically a high school degree), while the professionals had substantially more schooling (undergraduate or graduate training).

It should be noted that since no child appeared in the sample twice and the groups of caregivers were not matched on any variable, the results from the different informant samples in the analyses cannot be compared except in terms of their validity coefficients. In fact, no statistical tests of significance between KID Scale and BSID mean developmental ages were performed. This is because the two tests are different measures, having different items and different methods for deriving developmental age estimates. That is, the KID Scale and BSID developmental ages have different means and standard deviations, and therefore would be expected to differ. The manuals for the BSID (Bayley, 1969) and the KID Scale (Katoff, et al., 1980) contain detailed discussions of their scaling methods.

CHAPTER III

Results

The validity coefficients between KID Scale and BSID domain raw scores for the five geographic samples are presented in Table 5. All the Pearson product-moment correlation coefficients are significant ($p < .05$) and high except for the California sample on the language domains.

Tables 6 through 15, in the appendix, contain the validity coefficients and developmental age information analyzed by geographic sample. The validity coefficients expressed as correlation coefficients are all high and significant ($p < .05$) except for a few coefficients found in language and social domains. In the first three samples (Georgia, Florida, and California) the KID Scale developmental age estimates typically exceed the BSID estimates by about 1 to 1½ months. However, there is little discrepancy in developmental age estimates in motor areas for these samples. Discrepancies between KID Scale and BSID developmental age estimates in the Massachusettes and Ohio samples are somewhat smaller, with most differences less than a month. However, the differences were also predominantly in the direction of higher KID Scale than BSID

Table 5

Validity Coefficients by Geographic Sample

		Geographic Sample					
		GA.	FL.	CA.	MA.	OH.	Total
BSID	KIDS	(n=15)	(n=22)	(n=21)	(n=22)	(n=26)	(n=106)
COG	COG	.939	.911	.855	.833	.909	.890
LANG	LANG	.721	.713	.361*	.556	.832	.673
SOC	SOC	.760	.860	.742	.561	.881	.771
P D	MOTOR	.977	.957	.958	.936	.952	.957
M D	FULL	.921	.909	.838	.854	.926	.885

*$p > .05$

estimates. Since there were no discernable and consistent differences in the validity coefficients between geographic areas (i.e., almost all coefficients were high in all areas), the samples were combined for the remainder of analyses.

Table 16 contains the KID Scale test-retest reliability coefficients for the total sample. All of the correlations are statistically significant ($\underline{p} < .001$), and very high. There is a strong linear relationship between all domain raw scores of the two test administrations. In fact, the full scale test-retest coefficient was almost perfect ($r = .997$).

Table 17 contains data on the developmental age estimates derived from the two KID Scales. The mean developmental ages for all domains are similar. Mean developmental ages in the language domain differed significantly at the .05 level. This difference is not of practical significance, however. The self-help developmental ages were higher than the other domain developmental ages and the motor developmental scores the lowest.

The total sample validity coefficients for the KID Scale and BSID are reported in Table 18. These Pearson product-moment correlation coefficients are all significant ($\underline{p} < .001$). However, the coefficients are slightly lower than the test-retest reliability, particularly in language domains. The KID Scale full scale scores

Table 16

Test/Retest KID Scale Reliability Coefficients by Domain[a] for the Total Sample (N = 106)

KID Scale Domain	r
COG	.986
MOTOR	.995
LANG	.981
S H	.986
SOC	.989
FULL	.997

[a] All correlations are significant at $p < .001$.

Table 17

Mean Developmental Ages in Months

for Test/Retest KID Scales

Total Sample (N = 106)

	KIDS1	S.D.	KIDS2	S.D.	t	*p*
COG	6.26	4.32	6.35	4.51	-1.03	N.S.
LANG	6.56	3.25	6.35	3.29	-2.53	.05
SOC	6.38	3.49	6.28	3.53	1.56	N.S.
MOTOR	6.03	3.98	6.06	4.03	-0.53	N.S.
S H	7.54	4.04	7.41	3.97	0.53	N.S.
FULL	6.41	3.62	6.37	3.64	1.07	N.S.

Table 18

Concurrent Validity Coefficients for the KID Scale and the BSID[a,b]

Total Sample (N = 106)

	BSID						
KID Scale	COG	LANG	SOC	F M	G M	M D	P D
COG	.890	.659	.798	.879	.825	.878	.850
LANG	.717	.673	.713	.686	.610	.737	.634
SOC	.793	.642	.771	.759	.697	.801	.720
S H	.865	.663	.756	.881	.846	.854	.875
MOTOR	.866	.629	.717	.902	.944	.843	.957
FULL	.894	.687	.786	.898	.875	.885	.897

[a] All correlations are significant at $p < .001$.

[b] The second administration of the KID Scale was used in computing these correlations.

correlate highly with the BSID mental development (MD) scale (r = .885) and with the BSID motor development (PD) scale (r = .897).

Table 19 lists the mean developmental ages for the KID Scale and BSID for the total sample. Except in motor domains, the KID Scale developmental age estimates are about one month greater than the corresponding BSID subscale developmental age estimates. The KID Scale and BSID motor scores differ by less than one month.

Validity coefficients and developmental age data for KID Scale reports by mothers are presented in Tables 20 and 21. The correlation coefficients are all significant and, except in language and social domains, are all above .80. Fifty-three percent of the coefficients are greater than .80; 7% are greater than .90. Except in motor areas the developmental ages derived from the maternal KID Scale reports are about two months higher than the BSID estimates.

Validity coefficients for the professional sample are in Table 22. All coefficients are significant, but they are lowest in language and social domains. Forty-eight percent of the coefficients are greater than .80; 10% are greater than .90. Developmental age estimates for the professional sample are reported in Table 23. While KID Scale estimates are all slightly higher than

Table 19

Mean Developmental Age Estimates from the KID Scale and the BSID in Months Total Sample (N = 106)

KID Scale Developmental Ages			BSID Developmental Ages		
	Mean	S.D.		Mean	S.D.
COG	6.35	4.51	COG	5.42	4.47
LANG	6.35	3.29	LANG	5.20	4.31
SOC	6.28	3.53	SOC	5.15	4.37
S H	7.41	3.97	F M	5.41	4.61
MOTOR	6.06	4.03	G M	6.01	5.97
FULL	6.37	3.64	M D	5.24	4.27
			P D	5.71	5.54

Table 20

BSID and KID Scale Validity Coefficients[a,b]

Mothers Sample (N = 35)

	BSID						
KID Scale	COG	LANG	SOC	F M	G M	M D	P D
COG	.909	.635	.802	.899	.833	.894	.859
LANG	.694	.659	.712	.679	.572	.717	.591
SOC	.796	.636	.772	.773	.706	.804	.724
S H	.838	.654	.692	.841	.803	.823	.827
MOTOR	.859	.575	.660	.872	.955	.827	.961
FULL	.895	.659	.771	.891	.875	.881	.893

[a] All coefficients are significant at $p < .001$.

[b] The second KID Scale was used to compute the correlations.

Table 21

Mean Developmental Age Estimates in Months

Mothers Sample (N = 35)

KID Scale Developmental Ages			BSID Developmental Ages		
	Mean	S.D.		Mean	S.D.
COG	8.73	4.92	COG	6.97	5.16
LANG	8.08	3.23	LANG	5.93	4.85
SOC	8.09	3.59	SOC	6.21	4.93
MOTOR	8.10	4.26	F M	7.39	4.84
S H	9.35	3.46	G M	8.34	7.15
FULL	8.39	3.66	M D	6.63	4.86
			P D	7.97	6.62

Table 22

BSID and KID Scale Validity Coefficients[a,b]

Professional Sample (N = 37)

	BSID						
KID Scale	COG	LANG	SOC	F M	G M	M D	P D
COG	.857	.599	.780	.817	.819	.849	.832
LANG	.627	.581	.638	.553	.501	.654	.522
SOC	.750	.574	.774	.659	.640	.767	.654
S H	.873	.630	.715	.903	.871	.852	.899
MOTOR	.884	.609	.712	.926	.950	.855	.962
FULL	.898	.652	.789	.885	.882	.886	.899

[a] All correlations are significant at $p < .001$.

[b] The second KID Scale was used to compute the correlations.

Table 23

Mean Developmental Age Estimates in Months

Professionals Sample (N = 37)

KID Scale Developmental Ages			BSID Developmental Ages		
	Mean	S.D.		Mean	S.D.
COG	5.90	3.96	COG	5.19	4.00
LANG	6.24	2.84	LANG	5.70	4.00
SOC	6.04	3.10	SOC	4.93	4.01
MOTOR	5.52	3.89	F M	4.81	4.30
S H	6.70	3.85	G M	5.49	5.78
FULL	5.98	3.25	M D	5.04	3.79
			P D	5.19	5.17

BSID estimates, the discrepancies are smaller than in the mothers' sample (most less than one month).

As with the other two caregiver groups, the validity coefficients for nonprofessionals (Table 24) are all significant and lowest in social and language domains. However, even the lowest coefficient is above .70. In general, these coefficients were higher than the other caregiver groups, with 71% greater than .80 and 21% greater than .90. Table 25 contains the developmental age derivations for the sample of nonprofessionals. All differences between KID Scale and BSID comparable domain estimates are less than one month. In all cases, the KID Scale estimates are slightly higher than the BSID estimates.

Table 26 contains summary information on the validity coefficients for the three caregiver groups on similar KID Scale and BSID domains. For all three groups all coefficients are above .80 except in language and social areas where coefficients range from .581 to .786.

Table 24

BSID and KID Scale Validity Coefficients[a,b]

Nonprofessionals Sample (N = 29)

	BSID						
KID Scale	COG	LANG	SOC	F M	G M	M D	P D
COG	.898	.762	.865	.912	.827	.894	.867
LANG	.819	.785	.813	.791	.751	.834	.780
SOC	.831	.716	.786	.838	.750	.827	.790
S H	.899	.734	.886	.891	.912	.899	.933
MOTOR	.859	.738	.837	.895	.925	.859	.948
FULL	.908	.779	.883	.920	.895	.909	.926

[a] All correlations are significant at $p < .001$.

[b] The second KID Scale was used to compute the correlations.

Table 25

Mean Developmental Age Estimates in Months

Nonprofessionals Sample (N = 29)

KID Scale Developmental Ages			BSID Developmental Ages		
	Mean	S.D.		Mean	S.D.
COG	4.63	3.75	COG	4.33	4.02
LANG	4.68	3.13	LANG	4.05	4.10
SOC	4.73	3.27	SOC	4.52	4.28
MOTOR	4.71	3.27	F M	4.16	4.34
S H	6.51	4.17	G M	4.36	4.00
FULL	4.87	3.35	M D	4.26	4.07
			P D	4.12	4.01

Table 26

BSID and KID Scale Validity Coefficients[a,b]

by Caregiver

		Caregiver Relationship		
BSID	KIDS	Mothers	Profess.	Nonprofess.
COG	COG	.909	.857	.898
LANG	LANG	.659	.581	.785
SOC	SOC	.772	.774	.786
P D	MOTOR	.961	.962	.948
M D	FULL	.881	.886	.909

[a] All coefficients are significant at $p < .001$.

[b] The second KID Scale was used to compute correlations.

CHAPTER IV

Discussion

The following points summarize the results obtained in the three analyses reported:

(1) KID Scale and BSID domain and raw scores are highly intercorrelated, especially between similar domains. This is true across geographic samples and caregiver informants. Thus, there is a strong linear relationship between a KID Scale report on a severely handicapped child and his performance on the BSID.

(2) Validity coefficients are all high. Relatively speaking, they are lowest in language areas, moderate in social domains, higher in cognitive and full scale scores, and highest in motor areas.

(3) In general, KID Scale developmental age estimates are about one month higher than BSID estimates, except in motor areas where the estimates are more similar.

(4) KID Scale developmental age estimates vary somewhat depending on the informant's relationship with the child. Estimates from KID Scales completed by mothers are almost two months higher than the BSID estimates. Professionals' estimates based on KID Scale reports are about one month higher. Nonprofessionals' estimates are

less than one month higher than the BSID estimates. Motor developmental age estimates were less discrepant across informant types.

(5) KID Scale domain scores and BSID Kent Scoring Adaptation subscales are highly intercorrelated within each test and the comparable domain scores on each test correlate with each other. This gives the content validity of the respective domains some concurrent validity.

Validity Coefficients

The validity coefficients by domain and full scale generally exceed those considered acceptable in the developmental assessment literature. For the total subject sample (N = 106), cognitive and motor domains were highly correlated (r = .890 and .957 respectively); language and social domain coefficients were moderately highly correlated (r = .673 and .771). KID Scale full scale scores correlated .885 and .897 with the BSID mental and motor scales, respectively. When the data were examined separately for the five geographic subsamples, similar validity coefficients resulted, even though the children and their caregivers differed on level of development, types of relationships, and place of residence. Language and social domains demonstrated somewhat lower correlations and more variability between groups.

There were no large differences among the validity coefficients when the mother, professional, and nonprofessional groups were examined. About half or better of the validity coefficients in all three groups were greater than .80, and all contained some coefficients greater than .90. Thus, these groups all appeared capable of providing information on the KID Scale that has good concurrent validity with the BSID.

The inferiority of the coefficients in the language and social areas was perhaps due to characteristics of the domains on both instruments. There are few items, especially on the language domains in the BSID, which restricts the variability of scores and possibly attenuates the correlation coefficients. This is also true of BSID social items. In addition, several BSID and KID Scale language and social items occur on both scales. Finally, language and social behaviors may be less likely to be elicited by strangers in a formal assessment setting than by personal caregivers. Therefore, correlation coefficients would be reduced.

Developmental Age Estimates

Developmental ages derived from KID Scale reports were slightly higher than the BSID developmental age estimates. The discrepancy was smallest in motor areas, which contain the most concrete and readily observable behaviors. The estimates based on KID Scale reports of mothers were about two months higher than the BSID estimates. Since the first three geographic regions reported had a greater proportion of mothers comprising the samples those developmental age estimates were more discrepant than those in the other two areas. Nonprofessionals' KID Scale developmental age estimates, which were least discrepant from the BSID estimates, were about one month higher on the KID Scale.

Several factors may account for these results. First, the item age norms for the two instruments on which developmental age estimates are based were derived with different criteria. The age norm for the BSID item was set at the age at which 50% of the children passed the item. The KID Scale items were normed using a 65% passing criterion. Thus, the BSID item age norms may be somewhat lower than the KID Scale item age norms for comparable accomplishments. This would account for the higher developmental age estimates derived from the KID Scale in relation to those derived from the BSID.

Secondly, the KID Scale may more accurately represent the behavioral competencies and repertoires of a severely handicapped child than does the BSID. A caregiver may be aware of skills a child has that are not readily displayed to a strange diagnostician. It has been assumed that psychologists are more credible observers of behavior than are "professionals" (e.g., teachers), and that "professionals" are more credible than mothers (Gradel, 1979; Thompson, 1979). However, with a handicapped population, caregivers may be able to report information that is unavailable to psychologists but crucial to the description of developmental status. The KID Scale samples a broader range of behaviors than does the BSID. The self help scale, which yields the highest DA with this sample, has no items comparable to any BSID items. Social and language items are represented by only a few items on the BSID as well. In addition, the BSID has never been formally adapted for use with severely and profoundly handicapped young children. That is, the reliability and validity of the BSID with a handicapped population has not been studied.

The findings that mothers' estimates were more discrepant (higher) than those of other caregiver groups supports research previously cited. This research suggested that maternal reports yield higher developmental age estimates than do diagnosticians' and other caregivers'. It may be, however, that mothers possess such a special relationship with their child that they may have knowledge about behaviors, and can elicit them, in ways that other individuals cannot. The assumption that mothers are the least credible observers may not be valid in this context. However, it may also be true that mothers are overestimating the competencies of their child.

Nonprofessionals may have estimated lower than the mothers and professionals for the following reasons. The nonprofessionals were mostly from the Ohio sample where the children were all institutionalized and were at the lowest levels of functioning. Thus, the extremely limited behavioral repertoires of the children may have influenced the caregivers' perceptions and amount of interaction with them (Reuter, et al., 1980). Therefore, the knowledge they had about the children may be different from that available to caregivers in other samples. Another interpretation is that the aides, who worked intimately as primary caregivers with the children, actually had superior perceptions and understanding about their children's competencies. Perhaps the nature of the relationship permitted more accurate and unbiased appraisals than with the mothers who might be more emotionally invested in the child. This hypothesis supports the notion of decreased credibility of maternal observations.

Since the two instruments were normed differently and have slightly different domain classifications, it is not suprising that developmental age estimates based on

KID Scale reports differ from the BSID age estimates. However, the findings that differences between KID Scales and BSID developmental age estimates vary with the type of informant has interpretative implications for KID Scale results. For example, developmental age estimates based on KID Scales that mothers and teachers complete may differ. This question regarding the interpretation of KID Scales merits further investigation. A study that would directly compare KID Scales from mothers with those from other informants would address this question.

Conclusions

There are some caveats with respect to interpreting the results reported here. The geographic subsamples of caregivers were not homogeneous in chronological age, developmental age, diagnosis, or place of residence. This resulted in a confounding of developmental age estimates with respect to the caregiver providing the information. That is, higher functioning children lived at home and had maternal reports available, while the lowest functioning children were institutionalized and had more nonprofessional KID Scales completed. Secondly, having only one caregiver report on a child prohibited making comparisons on actual developmental estimates across informant types. Thirdly, the reliability of the Kent Scoring Adaptation of the BSID has not been established. However, the present research does provide some evidence of its domain validity with the handicapped population for which it was designed.

The issues raised about the differential accuracy of the various informants on the KID Scale cannot be resolved from the present research and may need to be addressed by further research undertakings. The results obtained, however, do substantiate the KID Scale's diagnostic utility and substitutability with respect to the BSID. Messick (1980) associates such substitutability with concurrent validity. Clearly, the KID Scale is as good as the BSID for assessing the developmental status of severely and profoundly handicapped children. The KID Scale has the advantages of enlisting caregiver involvement, being cost-effective, and educationally useful to the caregiver. Not only is it an adequate measure of developmental status of severely and profoundly handicapped children, but it may actually be more appropriate for that population than most infant instruments currently being used for that purpose.

APPENDIX A

KENT SCORING ADAPTATION OF THE BAYLEY SCALES OF INFANT DEVELOPMENT

INSTRUCTIONS:

Obtaining a Developmental Age (DA) for Cognitive, Language, Social, Fine Motor, and Gross Motor Domains.

1. After completely administering the Bayley Scales of Infant Development, transfer each correctly passed item to its corresponding square on the inside graph by coloring in that square. The ragged-edged squares found on the Fine Motor domain are items taken from the Psychomotor Scale of the Bayley, as are all the items in the Gross Motor domain. Please note that some items fall in more than one domain.
2. To determine a separate Developmental Age (DA) for each of the 5 domains, count the number of colored squares in an area. Find that number in the column directly to the right of those squares. Read off the equivalent DA of that total domain score by moving horizontally to the extreme left of the DA column. For example: If a child passes 63 items in the Cognitive domain, then 63 can be found in the column directly to the right of the squares and is seen to fall on the line representing 9 months DA. Hence, the child is functioning at approximately the 9 month level in the Cognitive domain.
3. Items passed on a subsequent test can be indicated on the inside graph by coloring in the appropriate squares with a second color.

Plotting the Developmental Ages by Domain

1. The range in DA months should be filled in along the vertical axis of the graph on page 4. The examiner can determine this range by making each horizontal line represent 1 month, 2 months, 3 months, etc. depending upon the projected developmental potential from test-to-test for the child being evaluated. If a child is developing in a near-normal pattern, then all 30 months should be filled in along the vertical axis.
2. The DA points for the 5 domains should then be plotted above the appropriate domain. The 5 DA's for this particular assessment (a DA for each domain) should be connected with a solid line. Any future tests should also be plotted on this same graph and the scores added to the Summary Table as a cumulative record.

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DA	COGNITIVE	LANGUAGE	SOCIAL	FINE MOTOR	GROSS MOTOR
					67
30.5	110-112	33		85-86	62-66
30	109			84	57-61
29.5					56
29					
28.5		32		83	55
28	108			82	53-54
27.5					
27	107			81	
26.5	104-106		28	79-80	
26		31			51-52
25.5	102-103				50
25		29-30			49
24.5	101		27	78	48
24	100	28			47
23.5		27			45-46
23	99			77	44
22.5	98	26		76	
22	97	25	26		43
21.5	96	24		75	
21		23			42
20.5	95			74	
20	92-94	22	25	73	
19.5	91	20-21		72	
19		19			
18.5					
18	89-90	17-18	23-24	69-71	41
17.5					
17	85-88			65-68	
16.5	84			64	38-40
16					37
15.5		16			
15	83	15		63	36
14.5	82	14		62	35
14	79-81			59-61	
13.5	78			57-58	
13	76-77			55-56	34
12.5	74-75	13	22	53-54	
12	71-73	12		50-52	33
11.5	69-70			48-49	
11			21		32
10.5	67-68	11	20	46-47	
10	65-66		19	44-45	30-31
9.5	64	9-10		43	
9	62-63			40-42	28-29
8.5	61			39	26-27
8	59-60	7-8	18	36-38	
7.5	58			35	24-25
7		6		33-34	22-23
6.5	56-57		17	31-32	21
6	50-55		16	26-30	20
5.5	43-49		14-15	20-25	18-19
5	38-42	5	13	14-19	17
4.5	34-37		12	11-13	15-16
4	29-33			8-10	14
3.5	23-28		11	5-7	
3	20-22		10	2-4	
2.5	17-19	3-4	8-9		11-13
2	13-16	2	6-7		8-10
1.5	11-12		4-5		
1	8-10	1	2-3	1	5-7
.5	1-7		1		1-4

AGE__________ DATE TESTED__________

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DEVELOPMENTAL AGE GRAPH

DA IN MONTHS						
	COGNITIVE	LANGUAGE	SOCIAL	FINE MOTOR	GROSS MOTOR	

CHILD'S NAME____________________________________BIRTHDATE__________________

SUMMARY TABLE

BAYLEY DATA					COGNITIVE		LANGUAGE		SOCIAL		FINE MOTOR		GROSS MOTOR	
TEST DATE	MENTAL		PSYCHOMOTOR		Items Passed	DA	Items Passed	DA	Items Passed	DA	Items Passed	DA	Items Passed	DA
	Raw Score	MDI	Raw Score	PDI										

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APPENDIX B

Tables contain the following abbreviations of the KID Scale and BSID domains titles:

KID Scale Domain

Cognitive - COG
Language - LANG
Social - SOC
Self-Help - S H
Motor - MOTOR
Full Scale - FULL

BSID

Kent Scoring Adaptation Domains
Cognitive - COG
Language - LANG
Social - SOC
Fine Motor - F M
Gross Motor - G M
Mental Development - M D
Psychomotor Development - P D

Table 6

BSID and KID Scale Validity Coefficients[a,b]

Georgia Sample (N = 15)

	BSID						
KID SCALE	COG	LANG	SOC	F M	G M	M D	P D
COG	.939	.695	.738	.929	.916	.906	.919
LANG	.717	.721	.658	.630	.636	.738	.609
SOC	.840	.753	.760	.805	.789	.845	.777
S H	.936	.758	.735	.964	.943	.910	.952
MOTOR	.903	.745	.700	.950	.976	.877	.977
FULL	.940	.779	.762	.947	.948	.921	.946

[a] All correlations are significant at $p < .01$

[b] The second administration of the KID Scale was used in computing these correlations

Table 7

Mean Developmental Age Estimates in Months

Georgia Sample (N = 15)

KID Scale Developmental Ages			BSID Developmental Ages		
	Mean	S.D.		Mean	S.D.
COG	7.24	4.09	COG	6.00	4.60
LANG	7.57	2.91	LANG	6.20	4.66
SOC	7.59	3.03	SOC	6.27	4.57
MOTOR	7.41	4.24	F M	5.87	5.40
S H	8.80	3.43	G M	7.90	6.85
FULL	7.69	3.58	M D	5.97	4.46
			P D	7.53	6.74

Table 8

BSID and KID Scale Validity Coefficients[a,b]

Florida Sample (N = 22)

	BSID						
KID SCALE	COG	LANG	SOC	F M	G M	M D	P D
COG	.911	.673	.851	.906	.853	.899	.873
LANG	.866	.713	.864	.859	.705	.870	.737
SOC	.894	.676	.860	.880	.801	.889	.828
S H	.908	.681	.842	.913	.854	.896	.884
MOTOR	.878	.591	.751	.889	.951	.851	.957
FULL	.924	.674	.848	.924	.894	.909	.913

[a] All correlations are significant at $p < .01$

[b] The second administration of the KID Scale was used to complete these correlations

Table 9

Mean Developmental Age Estimates in Months

Florida Sample (N = 22)

KID Scale Developmental Ages			BSID Developmental Ages		
	Mean	S.D.		Mean	S.D.
COG	7.87	5.59	COG	6.43	5.83
LANG	6.96	3.92	LANG	5.82	5.58
SOC	7.27	4.11	SOC	5.34	5.77
MOTOR	7.65	4.62	F M	6.66	5.62
S H	8.95	3.95	G M	8.02	7.79
FULL	7.62	4.21	M D	6.02	5.58
			P D	7.57	7.31

Table 10

BSID and KID Scale Validity Coefficients [a,b]

California Sample (N = 21)

	BSID						
KID SCALE	COG	LANG	SOC	F M	G M	M D	P D
COG	.855	.337*	.748	.817	.704	.845	.744
LANG	.565	.361*	.590	.450	.322*	.598	.368
SOC	.713	.368	.742	.611	.526	.739	.552
S H	.786	.394	.593	.803	.797	.772	.825
MOTOR	.841	.311*	.564	.904	.935	.795	.958
FULL	.852	.374	.697	.837	.789	.838	.821

[a] All coefficients are significant at $p < .05$ unless "*".

[b] The second administration of the KID Scale was used to compute these correlations.

*$p > .05$

Table 11

Mean Developmental Age Estimates in Months

California Sample (N = 21)

KID Scale Developmental Ages			BSID Developmental Ages		
	Mean	S.D.		Mean	S.D.
COG	7.39	4.42	COG	6.07	3.82
LANG	7.40	2.81	LANG	5.50	3.74
SOC	7.25	3.24	SOC	5.67	3.51
MOTOR	6.61	3.92	F M	6.60	3.85
S H	8.09	3.36	G M	6.48	6.01
FULL	7.20	3.23	M D	5.74	3.29
			P D	6.21	5.20

Table 12

BSID and KID Scale Validity Coefficients[a,b]

Massachusetts Sample (N = 22)

	BSID						
KID Scale	COG	LANG	SOC	F M	G M	M D	P D
COG	.833	.738	.729	.799	.806	.819	.818
LANG	.400	.556	.418	.361	.408	.425	.402
SOC	.590	.640	.561	.546	.535	.598	.545
S H	.840	.665	.684	.859	.789	.809	.824
MOTOR	.879	.756	.751	.892	.920	.860	.936
FULL	.866	.791	.756	.856	.860	.854	.877

[a] All correlations are significant at $p < .05$

[b] The second KID Scale was used to compute these correlations.

Table 13

Mean Developmental Age Estimates in Months

Massachusetts Sample (N = 22)

KID Scale Developmental Ages			BSID Developmental Ages		
	Mean	S.D.		Mean	S.D.
COG	5.57	3.73	COG	5.20	3.67
LANG	5.97	2.67	LANG	4.89	3.43
SOC	5.79	3.00	SOC	5.00	3.31
MOTOR	5.50	3.52	F M	4.75	3.39
S H	6.36	3.90	G M	5.73	4.65
FULL	5.84	2.94	M D	5.16	3.59
			P D	5.20	4.00

Table 14

BSID and KID Scale Validity Coefficients[a,b]

Ohio Sample (N = 26)

	BSID						
KID Scale	COG	LANG	SOC	F M	G M	M D	P D
COG	.909	.766	.921	.904	.806	.921	.860
LANG	.793	.832	.835	.810	.712	.832	.771
SOC	.840	.700	.881	.812	.678	.858	.734
S H	.890	.742	.891	.903	.896	.900	.932
MOTOR	.874	.726	.870	.908	.922	.881	.952
FULL	.911	.781	.927	.920	.864	.926	.911

[a] All correlations are significant at $p < .001$.

[b] The second KID Scale was used to compute the correlations.

Table 14

BSID and KID Scale Validity Coefficients[a,b]

Ohio Sample (N = 26)

	BSID						
KID Scale	COG	LANG	SOC	F M	G M	M D	P D
COG	.909	.766	.921	.904	.806	.921	.860
LANG	.793	.832	.835	.810	.712	.832	.771
SOC	.840	.700	.881	.812	.678	.858	.734
S H	.890	.742	.891	.903	.896	.900	.932
MOTOR	.874	.726	.870	.908	.922	.881	.952
FULL	.911	.781	.927	.920	.864	.926	.911

[a] All correlations are significant at $p < .001$.

[b] The second KID Scale was used to compute the correlations.

Table 15

Mean Developmental Age Estimates in Months

Ohio Sample (N = 26)

KID Scale Developmental Ages			BSID Developmental Ages		
	Mean	S.D.		Mean	S.D.
COG	4.39	3.82	COG	3.90	4.10
LANG	4.61	3.18	LANG	4.13	4.07
SOC	4.32	3.17	SOC	4.04	4.37
MOTOR	3.97	3.02	F M	3.67	4.30
S H	5.63	4.11	G M	3.08	3.24
FULL	4.33	3.23	M D	3.85	4.08
			P D	3.12	3.33

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Validity of Caregiver Information on the Developmental Level of Severely Handicapped Young Children.

Terry Stancin, Virginia Dunn, Laura Bickett, and Jeanette Reuter

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Validity of Caregiver Information on the Developmental Level of Severely Handicapped Young Children

Terry Stancin, Virginia Dunn, Laura Bickett, and Jeanette Reuter
Kent State University

Running head: Validity of Caregiver Information

Key terms: Caregiver report, developmental assessment, severely handicapped children, Kent Infant Development Scale, Bayley Scales of Infant Development

All correspondence should be directed to Jeanette Reuter, Department of Psychology, Kent State University, Kent, Ohio 44242.

Abstract

Two studies were conducted to examine the validity of caregiver information on the developmental status of severely handicapped children. First, developmental information on 106 severely handicapped children from a caregiver-completed behavior inventory, the Kent Infant Development (KID) Scale, was compared to that obtained from the Bayley Scales of Infant Development (BSID). Developmental age (DA) estimates from both tests were highly correlated and similar. The authors conclude that the KID Scale can be substituted for the BSID with severely handicapped children. In a second study examining the differential validity of caregivers, mothers' KID Scales yielded higher DA estimates than teachers.

Validity of Caregiver Information on the Developmental Level of Severely Handicapped Young Children

A major problem in evaluating the outcome of early educational and environmental interventions with young severely developmentally disabled children is valid assessment (Bronfenbrenner, 1975). Because there are no age-appropriate standardized measures on which these children can perform enough of the tasks for the measure to yield any useful information, the clinician is left using tests that were standardized on healthy infants. This invalidates the test results, according to the *Standards for Educational and Psychological Tests* (1974). In addition, the low and often labile response level of severely handicapped young children brings into question the standard one to two hour professional assessment as a source of developmental information (Haskett & Bell, 1978).

There are other psychometric problems associated with the measures used. The older handicapped children's raw test scores cannot be converted to developmental quotients by using the age tables accompanying infant tests. Rather, a child's developmental age (DA) must be approximated using the normative tables, and is therefore not based directly on the standardization data. Although infant tests have not been specifically adapted for use with disabled populations, they continue to be used because better alternatives do not exist.

Recently, individuals other than professionals, such as parents or other direct-care providers, have been used as sources of developmental assessment data with both disabled and nondisabled infants and children

(Colligan, 1976; Frankel, 1979; Gradel, 1979; Knobloch, Stevens, Malone, Ellison,& Resemberg, 1979; Thompson, 1979; Thompson, Currey,& Yance, 1979). There are many advantages to enlisting caregivers in making developmental assessments. Caregiver reports are more cost-efficient with respect to professional time. They facilitate treatment by involving caregivers in the initial stages (Bronfenbrenner, 1975; Tjossem, 1976). They maximize the ecological validity of evaluations by permitting information to be gathered from a variety of sources (Irvin, Crowell, & Bellamy, 1979; Thompson, 1979). However, the reliability and validity of developmental information from caregivers remains to be established.

Studies aimed at evaluating the credibility of caregiver information have generally been one of three kinds. Caregivers, typically parents, have been asked to make global predictions about their child's IQ or DA (Ewert & Green, 1957), to make predictions about their child's performance on items from a standardized intelligence test (Capobianco & Knox, 1964; Gradel, 1979; Hanson, Vail, & Irvin, 1979; Thompson, 1979), or to complete a caregiver questionnaire that would be compared with another caregiver's responses on that questionnaire (e.g., a teacher's responses) (Cole, 1976; Gradel, 1979; Kaplan & Alatishe, 1976; Thompson, 1979; Dunn, Stancin, & Reuter, Note 1). Results from these studies suggest that caregivers can be reliable observers of their child's behavior and developmental functioning if the data furnished are not retrospective or subjective (Saxon, 1975). However, the results also suggest that mothers of handicapped and non-handicapped children tend to judge the developmental level of their child to be higher than do other caregivers or professional diagnosticians (Capobianco & Knox, 1964; Gradel, 1979; Hanson, Vail, & Irvin, 1979).

It is generally accepted that psychologists are the most credible observers of behavior for developmental assessments, that teachers are somewhat less credible, and that parents and direct-care providers are the least credible. Therefore, it has been assumed that mothers are overestimating their child's development when their reports yield higher DA estimates than did professionals. However, mothers have a greater opportunity to observe their children under broader circumstances than do teachers who have to divide their attention among many children, or a psychologist who only observes a child for an hour or so (Frankenburg, vanDoorninck, Liddel, & Dick, 1976). In addition, caregivers are able to report information on adaptive behaviors that is unavailable to psychologists but is crucial to the accurate description of developmental status. Children fail to perform for an examiner all that their mothers say they can do. However, it is not surprising that a child's actual performance on a professionally administered test would be less than what a mother predicted that child's performance could be. Caregivers base their predictions of a child's performance on summative observations of their child's demonstrated competence, whereas professionally administered tests are limited performance samples.

In the studies on the accuracy of caregiver reports previously cited, the information gathered from mothers was not structured by standardized instruments with known psychometric properties. If the reliability and validity of an assessment instrument have not been determined, then the utility and accuracy of its results cannot be established. There are two problems, then, in assessing the developmental status of severely handicapped young children. One is the use of tests with non-handicapped norming samples, and the other is the lack of standardized caregiver inventories. Despite the fact that age norms cannot be established using handicapped samples, this research was based on the premise that infant tests can be adapted by establishing their reliabilities and validities with samples of handicapped children.

This paper reports on two studies which examined the validity and reliability of caregiver information on the developmental status of severely handicapped children. Caregiver information was structured by the Kent Infant Development (KID) Scale (Katoff, Reuter, & Dunn, 1980). In the first study, DAs derived from KID Scale reports from mothers, teachers, aides, and other caregivers were compared to DAs derived from professionally administered Bayley Scales of Infant Development (BSID) (Bayley, 1969). In the second study, KID Scale reports from mothers were compared to those from teachers and teacher's aides on a sample of 57 handicapped children.

Method

Instruments

The KID Scale is a caregiver-completed inventory consisting of 252 items describing behaviors characteristic of the first year of life in normal healthy infants. These behaviors are grouped into five domains based on item content: Cognitive, Motor, Language, Self Help, and Social. In addition, it is possible to get a Full Scale score which contains the results of all the domain items. Each item has a corresponding age norm that was derived from a sample of maternal reports on 357 presumed healthy infants. Reliability and validity estimates based on the norming sample were high (Katoff, 1978).

To complete the KID Scale, a caregiver reads each of the 252 items printed in the test booklet and grids in the appropriate response on the computer-scorable answer sheet. The items are written for a fourth grade reading level and represent observable behaviors designed to be as inclusive as possible of an infant's behavioral repertoire. There are four possible answers to each item stem: (A) Yes, (B) Used to do it, but outgrew it, (C) Is no longer able to do it, and (D) No, cannot do it yet. Either an A or B response constitutes the caregiver endorsement. The answer sheets are computer scored and a printout is created for each child. The printout lists each item in a domain in order of its age norm, and records the responses endorsed by the informant. This information can be useful for designing individual program plans because the sequences and patterns of a child's strengths and deficits are concretely described (Reuter, Katoff, & Dunn, 1981). DAs based on item age norms are derived for each domain and for the Full Scale.

The professionally administered test with which the KID Scale was compared was the BSID (Bayley, 1969). It is the most frequently used standardized developmental test for assessing severely handicapped young children. Although Bayley does not recommend it for individuals who score more than three standard deviations below the mean (DQ$<$ 52) (Bayley, 1969; Grossman, 1973), DAs for the Mental and Motor Scales for these severely handicapped children were determined by tabling back raw scores to a mean developmental index (DI) equal to 100 (Bayley, 1969).

There are two differences in the construction of DA norms between the KID Scale and the BSID that need to be noted. First of all, chronological age designations were calculated differently for the different norming samples. KID Scale ages were based on the infant being in its nth month; i.e., a 3 month label included infants between the ages of 2 months, 1 day, to exactly 3 months. However, the BSID age norms were based on a sample of infants who were tested at the given age within a four-day limit on either side. Thus, an age of 3 months on the BSID corresponds to a midpoint age of 3 months, while an age of 3 months on the KID Scale corresponds to a midpoint age of 2½ months. As a consequence, KID Scale norms result in age labels that are a half month higher than the BSID item norm labels. A second norm construction difference is the criteria for determining item age designations. The KID Scale item age norms were based on the age at which 65% of the children passed a given item, whereas a 50% passing criterion was used with the BSID. The 65% passing criterion of the KID Scale resulted in higher age norm designations than the BSID. Thus, KID Scale reports would be expected to yield somewhat higher DA estimates than the BSID.

Data Pool

One hundred twenty-one severely handicapped young children between the ages of one and nine years from five geographic locations in the U.S. served as subjects for the studies. The children had either been diagnosed severely or profoundly retarded based on standardized psychological test administrations (IQ $<$ 35) or were multiply handicapped children who were largely nonambulatory and nonverbal. Some of the children were institutionalized, some lived with their parents, and some lived in group homes. Their specific diagnoses varied, and most of the children had multiple disabilities. The children's chronological ages correlated .17 ($p < .05$) with their BSID Mental DAs. Because chronological age and sex accounted for less than 3% of the variance in developmental levels of this population, the subjects were treated as homogeneous with respect to age and sex.

Each child had two caregivers who could provide developmental information for him or her. The caregivers were all direct-care providers who were relatives (parents or grandparents), health and educational personnel (e.g., nurses, teachers, physical therapists, ward supervisors), or aides (child care or teacher's aides). Each child and associated caregivers in the data pool formed an independent data triad.

Each caregiver completed two KID Scales on a child within about a two week interval. During that interval the BSID was administered to each child by trained, experienced psychometricians. Standardized instructions were followed as closely as possible considering the handicaps of the children. Raw scores and developmental age estimates for the BSID Mental and Motor Scales were recorded. Of the two KID Scales each informant completed on a child, the second one was chosen as comparison with the BSID results. This ensured that the caregiver had completed at least one prior KID Scale. The assumption was that more experience in using the instrument would improve the caregiver's accuracy of the observation and report.

Study 1. Most Reliable Caregiver Validity

The sample used for this study was constructed so as to minimize the effect of unreliable reporting and therefore to derive the optimal validities possible within the limitations of the KID Scale itself.

Subjects

One hundred six children from the data pool and their most reliable caregiver formed the subject dyad pairs. This most reliable decision was based on the differences between the total KID Scale scores on the two succeeding administrations, with the informant having the smaller absolute Full Scale score difference between the test and retest designated as more reliable than the other. An exception to this selection guideline occurred when the more reliable caregiver in a pair was also the more reliable for another child. In these cases the alternate caregiver was chosen, providing that the difference between the test-retest raw scores was less than ten points. If the difference was greater, the case was dropped. There were 15 cases that had to be dropped from the sample for this reason. The mean differences between Full Scale raw scores for this sample of most reliable KID Scales was 3.2 points (S.D. = 8.9). This resulted in a sample of caregivers whose KID Scale retest reliability coefficient was .99.

The children were 61 males and 45 females between the ages of 18 and 108 months (mean= 60.9, S.D. = 21.8). The caregivers were 35 mothers, 30 teachers, 25 child care aides, 6 nurses, 4 physical or occupational therapists, 4 teacher's aides, a grandmother and a ward supervisor. On the average, caregivers had cared for their children for about 2 years (mean = 25.5 months, S.D. = 25.2). The mean educational level of the caregivers was 14.2 years (S.D. = 2.5). Practically all of the caregivers were female (99%).

Results and Discussion

The validity coefficients between KID Scale domain scores and BSID Mental and Motor Scale scores are presented in Table 1. These Pearson product-moment correlation coefficients are all very high. The KID Scale domain DAs were highly intercorrelated in this sample with r's ranging from .68 to .91. Therefore, no claims are made for the discriminant validity of these domains.

Insert Table 1 about here

Table 2 lists the differences between mean DAs for the KID Scale and BSID for this sample. The KID Scale DA estimates were significantly higher (about one month greater) than the DA estimates derived from the BSID Mental Development Scale. DAs from the KID Scale domain scores and BSID Motor Development Scale were less discrepant with only Self Help and Full Scale domain DAs differing significantly.

Insert Table 2 about here

The higher DAs derived from KID Scale reports with respect to the BSID DAs were not surprising since there are inherent differences in the norming procedures for the current form of the KID Scale and the BSID. The BSID DAs were extrapolated from deviation scores called developmental indexes (mean = 100, S.D. = 16) for each age, whereas the KID Scale DAs are derived directly from item age norms. Differences in computing the item age norms and age labels for the two instruments that have already been discussed in the Instruments section also affected the DA discrepancies. While this month discrepancy is statistically significant, it is not clinically very important. For handicapped children, however, it may be clinically advantageous to change the bases for calculating the KID Scale norms from the 65% passing criterion to a 50% passing criterion so that they correspond more directly with the BSID DAs.

In the first study, DAs derived from the KID Scale and the BSID were essentially the same if we took into account their different norming conventions. However, the KID Scale DAs in this study were derived from reports by both mothers and unrelated caregivers. Because other investigators have reported that maternal reports yield higher DAs than reports from other observers, the next study examines the differential validities of reports by mothers and teachers.

Study 2. Mother and Teacher Pairs

Subjects

All possible pairs of mothers and teachers or teacher's aides were selected from the data pool. This resulted in 57 unique pairs of caregivers each of which reported on the same child. The children were 31 males and 26 females between the ages of 25 and 96 months (mean = 59.5 months, S.D. = 20.6). The mothers had all been taking care of their disabled children since birth. Most of the mothers had about a high school education (mean = 12.6 years, S.D. = 2.1). The amount of time the teachers had known the children varied from 1 to 30 months (mean = 10.2 months, S.D. = 8.0). Most of the teachers had a college degree and all were females.

Results and Discussion

The inter-judge correlation coefficients of raw scores for the mother and teacher pairs are the following: Cognitive = .878; Motor = .962; Language = .681; Self Help = .934; Social = .776; and Full Scale = .917. All of the correlations are significant ($p < .001$).

Table 3 contains the validity coefficients for the mothers and teachers. The concurrent validity coefficients for the two groups of caregivers were similarly very high.

Insert Table 3 about here

The KID Scale DAs for the two caregiver groups are compared in Table 4. In every domain the mother's KID Scales yielded significantly higher DA estimates than did the teachers' KID Scales.

Insert Table 4 about here

While there were no discernable differences in the concurrent validity coefficients for the two caregiver groups, there were differences in the mean estimates of DAs. These results replicate findings of previous research that reported higher DA estimates by mothers than by teachers. The very high interjudge correlations between the mothers' and teachers'

KID Scales and their similar high concurrent validity coefficients are an indication that both types of informants are reliably reporting on similar behavioral observations.

Conclusions

Every concurrent validity coefficient of the KID Scale with the BSID is significant and very high. The small differences in DAs obtained from BSID and KID Scales were dependent on the norming procedures of both tests. These differences, which were about one month, were statistically different but not clinically very important. The results obtained from this research support the validity of caregiver reports of developmental information for severely handicapped young children. In particular, the results substantiate the KID Scale's diagnostic utility and substitutability with respect to the BSID. Messick (1980) associates such substitutability with concurrent validity. Therefore, it appears appropriate to substitute a caregiver report instrument, the KID Scale, for the BSID in the assessment of the developmental status of severely handicapped young children.

The implications of this substitutability are significant. The lower administration costs of caregiver instruments permit more frequent assessments, thus facilitating treatment planning and evaluations. The psychologist's contribution to the assessment can be concentrated on the intervention and interpretation phases rather than on the test administration and scoring phase. The KID Scale contains functional, observable behaviors as items and for this reason has ecological validity which yields prescriptive utility. The functional items describe competencies that children need to learn. It is of little adaptive value to teach a child BSID items.

Mothers endorsed more KID Scale items on their children and therefore their reports yielded higher estimates of developmental status than did those of teachers and teacher's aides. Again, the small differences (about one month) are statistically but not clinically significant. However, there are two possible explanations for these discrepancies. Mothers have more experience with their children over longer periods of time than do teachers. This may give them more opportunity to observe developing behaviors which they can then endorse on the KID Scale. For example, a teacher or psychologist may not have the opportunity to observe a handicapped child "help in dressing by pushing arms through sleeves" (KID Scale item #12), whereas a mother may. Therefore, summative competency judgments that mothers make on the KID Scale are based on more extensive behavioral sampling than the judgments made by teachers.

The other explanation for the discrepancies posited by earlier researchers is that the mothers lack objectivity and therefore overestimate their child's competence. The concrete, behavioral nature of the KID Scale argues against the overestimation hypothesis for this study because caregivers do not make predictions about how a child will respond. They simply state whether a specific behavior has ever been observed. In addition, the KID Scale items are presented to the caregiver in a random order with respect to item age norms and domain content, making consistent overestimation difficult.

We know that successful early intervention programs must involve caregivers, both mothers and teachers, as much as possible (Bronfenbrenner, 1975). An effective way to ensure that caregiver participation is early and strong is to involve them in the initial and subsequent assessment activities.

Footnotes

This study was supported by Department of Education Research Grant No. DED-G008001794. Views expressed herein do not necessarily represent those of the Department of Education.

The authors acknowledge the data collection efforts of field consultants Frances Archer, Cindy Legin-Bucell, Anne Copeland, and Katherine Reuter, and wish to express appreciation to the staff of the First Chance Project, particularly to Berendina de Vries.

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Table 1

Raw Score and DA Validity Coefficients of the KID Scale and the BSID for the Most Reliable Sample[a,b]

KID Scale Domains	BSID Scales Mental		Motor	
	Raw	DA	Raw	DA
Cognitive	.878	.844	.850	.789
Motor	.843	.803	.957	.912
Language	.737	.707	.634	.597
Self Help	.854	.804	.875	.794
Social	.801	.764	.720	.693
Full Scale	.885	.851	.897	.857

[a] N = 106.

[b] All $p < .001$.

Table 2

Differences Between DA Estimates from the KID Scale and the BSID in Months for the Most Reliable Sample[a]

KID Scale			BSID Scales			
			Mental[b]		Motor[c]	
Domain	Mean	S.D.	D[d]	*t*	D[d]	*t*
Cognitive	6.3	4.5	1.1	4.6***	0.6	1.9
Motor	6.1	4.0	0.9	3.2**	0.4	1.4
Language	6.3	3.3	1.1	3.7***	0.6	1.5
Self Help	7.4	4.0	2.2	8.6***	1.7	5.1***
Social	6.3	3.5	1.1	3.9***	0.6	1.5
Full Scale	6.4	3.6	1.2	5.2***	0.7	2.2*

[a] N = 106, *df* = 105.

[b] BSID Mental Scale DA: Mean = 5.2, S.D. = 4.3.

[c] BSID Motor Scale DA: Mean = 5.7, S.D. = 5.5.

[d] Differences between KIDS DAs and BSID DAs.

*$p < .05$.

**$p < .01$.

***$p < .001$.

Table 3

Raw Score and DA Validity Coefficients

for the Mothers and Teachers[a,b]

	KID Scale Domains	BSID Scales Mental		Motor	
		Raw	DA	Raw	DA
Mothers	Cognitive	.884	.816	.872	.781
	Motor	.818	.751	.962	.901
	Language	.671	.624	.550	.502
	Self Help	.815	.764	.867	.800
	Social	.808	.757	.754	.702
	Full Scale	.871	.814	.909	.851
Teachers	Cognitive	.885	.872	.844	.768
	Motor	.846	.820	.975	.932
	Language	.773	.788	.608	.586
	Self Help	.854	.818	.894	.842
	Social	.829	.819	.733	.698
	Full Scale	.906	.890	.919	.871

[a] $N = 57$.

[b] All $p < .001$.

Table 4

A Comparison of KID Scale DA Estimates in Months from Mothers' and Teachers' Reports[a]

KID Scale Domains	Mothers		Teachers			
	Mean	S.D.	Mean	S.D.	D[b]	*t*
Cognitive	7.6	4.5	6.3	4.0	1.3	4.4***
Motor	7.2	4.3	6.5	4.2	0.7	4.1***
Language	7.7	3.0	6.3	3.3	1.4	4.1***
Self Help	8.6	3.7	8.0	3.8	0.6	2.7**
Social	7.5	3.3	6.2	3.3	1.3	4.3***
Full Scale	7.6	3.5	6.6	3.5	1.0	4.9***

[a] N = 57, *df* = 56.

[b] Difference in DAs in mohths

**$p < .01$.

***$p < .001$.

Developmental Sequence of Severely Handicapped Children According to the *KID Scale* and the *Bayley Scales of Infant Development*.

Virginia Dunn, Terry Stancin, and Jeanette Reuter

Abstract

The Kent Infant Development Scale and the Bayley Scales of Infant Development were administered to 121 severely and profoundly handicapped young children. The percent of subjects passing each item was correlated with the item age norms on the Kent Infant Development Scale and on the Bayley Scales of Infant Development as a test of the similar sequence hypothesis. The results of this study corroborated findings from previous studies which indicate similarity between the developmental sequence of severely and profoundly handicapped children and normal infants.

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The authors acknowledge the data efforts of field consultants Frances Archer, Cindy Legin-Bucell, Anne Copeland, and Katherine Reuter, and wish to express appreciation to the staff of the First Chance Project, particularly to Berendina de Vries.

Requests for reprints should be sent to Jeanette Reuter, Ph.D., Department of Psychology, Kent, Ohio, 44242.

The developmental sequence in which severely and profoundly mentally retarded young children acquire cognitive, motor, language, social and independence skills has received limited empirical and theoretical attention. According to Gliedman (note 1), however, in application "even the boldest innovators in special education have taken for granted the existence of universal norms of child development, norms that hold for handicapped children as well as for the ablebodied." (p. 9) Indeed, the widespread use of measures which have been standardized on normal infants and children rests on the assumption that retarded children develop in much the same order, albeit more slowly, as normal children.

Weisz and Zigler(1979) in a comprehensive review of cognitive development studies of mentally retarded persons suggest that the order of developmental acquisition of behaviors can be evaluated empirically via the similar sequence hypothesis. The similar sequence hypothesis can according to Weisz and Zigler (1979) be explored using a cross-sectional approach or by using order of difficulty evidence. The cross sectional approach is accomplished by observing retarded subjects of different ages and comparing their developmental achievements at various ages to the accomplishments of nonretarded subjects at similar chronological ages. Order of difficulty evidence, on the other hand is gathered by establishing the "relative difficulty of the various tasks or behavioral items being employed." (p. 833) at the same developmental level.

The empirical work which addresses the developmental processes in reference to severely and profoundly retarded children and normal children have focused on the passage of severely and profoundly retarded children through the sensorimotor stage outlined by Piaget. Woodard (1959) using an order of difficulty model hypothesized that the stereotypic behavior exhibited by profoundly retarded children is a function of their development being arrested at the early levels of the sensorimotor stage. To test this she created several tasks that she felt were representative of the six levels of the sensorimotor stage and observed 68 institutionalized profoundly retarded children and adolescents along these six levels of the sensorimotor stage. Her subjects were then rank ordered according to the number of tasks they were able to pass at each level. The higher the sensorimotor level of the task the lower the number subjects who passed the tasks at that level. Thus, the order of difficulty established by rank ordering the number of subjects who passed a task at a given level matched the order of ascending complexity hypothesized by Piaget. This finding suggests profoundly handicapped children develop cognitively in the same fashion as normal children while attaining a much lower ceiling than normal children.

Rogers (1977) again employing the order of difficulty level model examined the scale characteristics of cognitive development in 40 profoundly retarded children along the upper four levels of the sensorimotor stage in four domains: object permanence, spaciality, imitation and causality. She found that the profoundly retarded children's performance of the object-permanence tasks and imitation tasks formed reproducable scales that were the same as those hypothesized by Piaget. Although the causality tasks formed a reproducable scale, the ordering was different from Piaget's. The spatial tasks failed to form a reproducable scale. These findings suggest that the cognitive development of profoundly retarded children is like normal children in some domains but is different from normal children in other domains.

Using a longitudinal design Kolheuter and Sindberg (1975) administered object-permanence tasks to 49 severely and profoundly retarded children monthly, until all subjects either passed the highest level of the sensorimotor stage or the subjects had been obseved tweve times. The authors found that some but not all of their profoundly retarded subjects made consistent developmental progress through the stages. Their findings suggest that profoundly handicapped children if they are able to make developmental progress , pass through the sensorimotor stages stages in the same order as their normal counterparts.

Finally, using Corman and Escalona's (1969) object permanence and spatial relationships scales, Silverstein, Pearson, Keller and McClain (1981) observed 98 institutionalized severely and profoundly retarded children. They administered the scales to the children three times at six month intervals and analysed their data using Green's scalability index. Like Rogers (1977) these authors found that the object permanence tasks formed a reproducable scale but that the spatial tasks did not. Silverstein et. al. (1981) concluded that they could give only limited support to the developmental position when explored through the similar sequence hypothesis.

Because assessment of and intervention strategies for profoundly retarded children rest on the assumption of universal developmental norms and because there is some experimental evidence suggesting an invariant sequence of development which includes profoundly handicapped children, the present study was undertaken. This study is an investigation of the similarities between profoundly retarded children and healthy infants of similar developmental ages in terms of the order of their acquisitions of behaviors, using both the Kent Infant Development (KID Scale)(Reuter, Katoff and Dunn,

1988) a caregiver completed inventory, and the Bayley Scales of Infant Development (BSID) (Bayley, 1969) a clinically administered instrument.

The item age norms of the BSID and the item age means of of the KID Scale provide an empirically derived set of developmentally ordered behaviors characteristic of normal infants. Those items which are accomplished at the earlier ages can be seen as easier than those accomplished later. Thus, if a group of profoundly retarded children progress developmentally in the same order only more slowly, as normal babies, then the most commonly endorsed items, i. e., those behaviors which most the mentally retarded subjects can perform should correspond to those test items with the earliest age norms. Further, if the order is similar for severely handicapped and normal infants using both the BSID and the KID Scale, the hypothesis of similar developmental sequence for severely handicapped can be affirmed across different measures.

METHOD

Subjects

The 121 severely handicapped children whose development was measured by both the BSID and the KID Scale had a mean chronological age of 68.2 months. The standard deviation was 21.7 months with a range of 18 months to 108 months. There were 71 males and 50 females. Eighty-nine of the children resided in institutions while 28 lived at home. The mean develpmental ages derived from the BSID mental scale was 5.0 months, s. d. 4.1 with a range of 0-18 while the BSID motor scale yielded a mean developmental age of 5.6, s.d. 5.4 with a range of 0-24 months. The KID Scale developmental age was 6.2 months, s.d. 3.3 months with a range of 1 to 14 months. The caregivers who filled out the KID Scales on these children were 40 mothers, 30 child-care aides, 29 teachers and 22 other types of caregivers.

Instruments

Two infant measures were used in this study, the Bayley Scales of Infant Development (BSID) (Bayley, 1969) and the Kent Infant Development Scale (KID Scale) (Katoff, Reuter, and Dunn , 1980: Reuter, Katoff and Dunn, 1981) The BSID is well documented in psychological literature and consequently will not be described here. The KID Scale is a caregiver-completed inventory consisting of 252 items describing behaviors characteristic of the first year of life in normal healthy infants. These behaviors are grouped into five domains based on items content: Cognitive, Motor, Language, Self Help, and Social. Each item has a corresponding age-norm that was derived from a sample of 480 presumed healthy infants from 1 month to 15 months of age. Reliability and validity estimates based on various subsamples of the norming sample were high (Katoff, Reuter, and Dunn, 1980).

To complete the KID Scale a caregiver reads each of the 252 items printed in the test booklet and grids in the appropriate response on a computer-scorable answer sheet. The items are written for a fourth grade reading level represent observable behaviors designed to be as inclusive as possible of an infant's behavioral repertoire. There are four possible answers to each item stem: (A) Yes (B) Used to do it but outgrew it (C) Is no longer able to do it, and (D) No, cannot do it yet.

Procedure

Each caregiver completed two KID Scales on a child within a two week interval for purposes of assessing the test retest reliability of the the KID Scale when used with handicapped children. During that interval the BSID was administered to each child by trained, experienced psychometricians. Standardized instructions were followed as closely as possible considering the handicaps of the children. Of the two KID Scales that each informant completed on a child, the second one was chosen for this study. This ensured that the caregiver had experience completing the KID Scale. The assumption was that more experience in using the instrument would improve the caregiver's accuracy of the observation and report.

Results

The reliability coefficients calculated from the raw scores of the first and second KID Scales were as follows: Cognitive ,.98, Motor, .99; Language, .96; Self-Help, .98; and Social, , .97. The consistency from observers of KID Scale reports over a short interval was almost perfect. These correlations did not vary among subgroups, domains or raw and developmental age scores. Therefore, the KID Scales used in this research were highly reliable over time.

In order to explore the relationship between developmental order in normal infants and severely handicapped children using the KID Scale, two sets of Spearman Rho coefficients were calculated in the following manner. Just as each item on the KID Scale has an item age mean, each item was either endorsed or not endorsed by a given percentage of all the caregivers completing the scales. This holds true for the mothers in the norming sample and for the caregivers in the handicapped sample. The data points for each correlation were the item age-norms and the percentage of caregivers in a particular sample who endorsed the item. This is the same type of analysis used by Woodard (1959) and is referred to by Weisz and Zigler (1979) as the order of difficulty approach.

The first set of KID Scale correlations was calculated to insure that there was a strong inverse relationship between the item age means and the order of the percent endorsement for subjects in the norming sample. These correlations were as follows: Cognitive, .-.99; Motor, -.99; Language, -.99; Self-Help, -.99, Social, -.99. These near perfect correlations indicated that the item-age norm order was essentially the same as the percent endorsement in the cross-validated norming sample. The second set of KID Scale correlations calculated was between the item-age mean rank order and the item percent endorsement order by caregivers of the handicapped children in our sample. These correlations were: Cognitive, -.91; Motor, -.98.; Language, -.91; Self-Help, -.75; Social, -.89. It can be seen from these correlations that the earlier the the item-age mean the greater the number of severely and profoundly handicapped children are seen as passing the item.

To examine the relationship the between the developmental acquisitions of infants and severely retarded young children using the BSID one set of Spearman Rho correlations was calculated. The data for the correlations consisted of the BSID item-age norms and the percent of handicapped children in our sample passing each item. Bayley (1969) recommends establishing a basal and ceiling score so that each item below the basal is considered as a pass and each item above the ceiling is seen as fail. It was not possible to correct for passes below the basal item in calculating the correlations. It was possible to correct for a ceiling effect by not including those items with item age norms above fourteen months on the Mental Scale and twelve months on the Psychomotor Scale. This also made the results from the analysis of the KID Scale and the BSID comparable in terms of the development of the subjects. The correlations between the item percent passes by handicapped children and the Mental Scale norms of the BSID was .95 and the correlation between the item percent passes by handicapped children and the Psychomotor Scale norms was .95. Using a different test, the earlier the item age norm, the greater the percent of handicapped children passing the item.

Discussion

The high correlations between the percent passes on each item and the item age norms on both the BSID and the KID Scale indicate that there is a strong relationship between the order in which severely and profoundly handicapped children acquire behaviors and the order in which infants acquire behaviors. This leads us to conclude that severely and profoundly handicapped children accomplish developmental milestones in a sequence similar to that of normal infants. The differences in chronological ages between the children in our handicapped sample and the infants in the norming sample indicate that severly and profoundly handicapped young children move through the developmental sequence more slowly than normal children. Because severely and profoundly handicapped children cannot be expected to recover from their disabilities, it is assumed that the ceiling of their development will be lower than that of children beginning life without handicaps.

As Weisz and Zigler (1979) and the review of relevant studies indicate, the previous work in assessing the developmental sequence of severely and profoundly handicapped children has focused on measures based on cognitive developmental theory. The present study is applied, centering on the use of standardized infant measures to gather evidence of developmental progress of severely and profoundly handicapped children. Our findings, based on psychometric tests, corroborate the findins of previous studies which give evidence for an equivalent developmental sequence for severely and profoundly handicapped children.

In addition, our findings indicate that tests which have been normed and standardized on healthy infants have application for the assessment of the developmental status and progress of severly and profoundly handicapped children. Despite the fact that severely and profoundly handicapped children were not included in the norming samples of infant tests, this research lends confidence to the validity of using infant tests for severely and profoundly handicapped young children whose developmental status is the same as that of infants. Although infant tests do not allow the calculation of developmental quotients (analogous to intelligence quotients) they can provide useful deveopmental benchmarks in the form of developmental ages for program planning.

The use of infant tests for program planning has particular relevance in reference to the KID Scale. The KID Scale results are in the form of a computer printout, in which the items are ranked according to the age norms from youngest to oldest by each domain with accompanying caregiver responses. All of the items on the KID Scale, because of the way in which it was contructed, can be seen as functional criterion behaviors. Our findings of similar developmental sequence of behaviors betweeen normal infants and severely and profoundly handicapped young children allow the use of KID Scale results prescriptively. That is, when a severely or profoundly handicapped child's KID Scale results are ordered by item age norms, the child's first series of failures on any domain can constitute training goals.

It must be noted that our findings depend on the aaumption that percent endorsement is an equivalent measure to item age norms for determining developmental sequence. Our work is subject to the limitations inherent in cross-sectional research. Both longitudinal documentation and the evaluation of the KID Scale and The PSID according to scaling techniques are necessary to determine without reservation that a sample of handicapped children and infants acquire their behaviors in the order described by the present work.

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Follow-up Studies on the KID Scale Results for Severely Handicapped Young Children.

Nancy Hoag, M.A. Thesis

This study is part of the first year research of this grant which investigated the validity and utility of the Kent Infant Development Scale (KID Scale) with severely and profoundly mentally retarded children. The present investigation attempts to provide an assessment of the development progress of this population over a six month interval. More specifically, it addresses the following three questions:

1) How useful in a predictive sense is the KID Scale in forecasting the relative developmental status of an individual over a six month period? In other words, to what degree are the developmental capabilities of the severely and profoundly mentally retarded individual consistent over time?

2) Are these individuals capable of significant change in developmental status within a six month period?

3) To what degree, if any, do the factors sex, chronological age, place of residency (home vs. institution), and diagnosis contribute to the predictability of developmental progress for this population?

METHODS

Four psychometric consultants and office staff contracted for a federal grant under the supervision of Dr. Jeanette Reuter, Professor of Psychology at Kent State University, selected the children for this study and were responsible for the data gathering. Proper consent to participate in this study was obtained from the parents and guardians according to the guidelines of the original grant proposal.

Subjects.

The subjects were 71 severely or profoundly mentally retarded children (IQ 35) selected from five geographic locations (Florida, Georgia, California, Massachusetts, and Ohio). They ranged in age from 18 months to 108 months with a mean chronological age of 60.9 months. For each child specific descriptive information was gathered including sex, place of residency (home vs. institution), and diagnostic classification (see Table 1).

The statistics in Table 1 illustrate that an effort was not made to select subjects so as to obtain equal numbers with regard to sex, place of residency, and diagnosis. As this study is descriptive in nature rather than intervention oriented, the primary intent of this investigation was to gather a sample with optimum caregiver-report reliability and number of subjects. Our aim was to construct a sample comprised of mentally retarded children who were undergoing a variety of behavioral intervention programs and living in different types of residential settings so as to obtain empirical data on a heterogeneous segment of this population. The diagnostic classifications presented in Table 1 were assigned to each child based on the diagnostic information provided in the medical records by a medical doctor or licensed psychologist.

Each child had two caregivers who knew that child well. The caregivers were all direct service providers who were relatives, professionals (teachers, nurses, physical therapists, or ward supervisors) or nonprofessionals (child care aides or teacher aides). These caregivers were responsible for providing the descriptive information for each child in the sample. They each also completed two initial KID Scales that were separated by a two-week interval and a follow-up KID Scale that was separated from the earliest evaluations by approximately a six month time interval.

Only one of the caregivers for each child was selected to remain in the study. The selection process was conducted in such a manner so as to obtain an optimum reliability in terms of caregiver reports and to insure that each child had a unique caregiver. An effort was made whenever possible to include in the study the caregiver in each pair that had the highest test-retest reliability for the two initial KID Scales. An exception was made only when the most reliable caregiver had completed KID Scales for more than one child. Also, some of the originally selected subjects of this sample were not included due to the lack of available follow-up data. Comparisons of developmental status over time were always obtained by comparing the second initial KID Scale of the caregiver with his or her follow-up KID Scale.

Measure

The initial and follow-up developmental evaluations of each child were obtained through the use of the KID Scale, an inventory designed to be used with healthy infants, high risk infants, and severely and profoundly handicapped individuals who are chronologically beyond the infancy period. It consists of 252 sentences that describe behaviors that are characteristic of a healthy infant in the first 12 months of life. The items represent five behavioral domains: cognitive (C), motor (M), language (L), self-help (SH), and social (SO). A developmental age score(DA) is provided for each of the domains. In addition, the results of all the inventory item endorsements yield a full scale score (FS).

These items were normed and cross-validated on a sample of 481 presumably healthy infants. The developmental age norm for each item corresponded to the chronological age at which 50% of the children passed the given item. The developmental age equivalents for each domain and for the full scale were the 35%tile of the distribution for each month age group.

Procedure

As described earlier, each of the 71 children were assigned a pair of caregivers. Both members of the pair completed two initial KID Scales that were separated by a week interval. A comparison of these two scales was performed for each caregiver to assess test-retest reliability. On the basis of the resulting coefficients one member of the pair was designated as the "most reliable" caregiver. Following a 6 month interval, each caregiver again completed a KID Scale (follow-up KID Scale). In a few instances, a new caregiver was needed to substitute for one of the original members. On the basis of a selection process that was described earlier only one caregiver of the original pair was selected for the study. Two of the KID Scales completed by that caregiver for their given child were used in the subsequent data analyses. In every instance, there was an initial KID Scale score and a follow-up or current KID Scale score filled out by the same caregiver.

Data Analyses

In response to the three original questions which were addressed by this investigation the data was analysed by three different psychometric approaches. First, the degree of association or consistency between developmental capabilities over a six month period was measured by correlating the developmental age (DA) at the initial evaluation with the follow-up DA. Pearson produced moment correlations were performed for each of the five behavioral domains as well as for the full scale domain so as to investigate the consistency or predictability of the specific behavioral areas that comprise the general developmental status.

Next, the extent of behavioral change that was evidenced by this sample within a six month period was investigated. A series of dependent t tests were performed on the initial and follow-up DA means.

Finally, six separate stepwise multiple regression analyses were performed in an attempt to investigate which psychosocial and organic variables significantly contributed to the prediction of current development status. The variables of interest included initial DA for the sex domains, initial chronological age (CA) of the child, sex, place of residency, and diagnostic classification. The criterion variables for the different analyses were the six follow-up DA scores. Since all of the predictor variables with the exception of CA and initial DA are nominal variables a dummy coding system was employed. Essentially, this system requires each alternative of a particular variable to be treated as a separate predictor Also, one of the levels of the variable is not included in the analysis and is treated as a "0" in a "0-1" binomial coding system. As a result, the female level of the sex variable, the institution level of the residency variable, and the mental retardation syndrome of the diagnosis variable are excluded from the design and assigned "0" values. As a result, negative correlations between the sex, residency or diagnosis variables and a criterion measure reflect a positive correlation between the criterion and the excluded or "0" variable level.

RESULTS

Prediction of Developmental Status

Prediction or consistency estimates of developmental status were obtained by correlating initial DA with follow-up DA for the cognitive, motor, language, self-help, social and full scale domains (See Table 2). All the correlations between initial and follow-up raw scale scores for the 5 subscale domains were highly significant (all p values $< .0001$). They ranged from .9646 to .9705. Similarly, a highly significant relationship was found to exist between initial full scale developmental age and the full scale developmental age assessed 6 months later ($r=.9741$, $p < .001$).

Mean Behavior Change

The degree of developmental change that occurred within specific behavioral areas as well as in the general developmental status (full scale) over a 6 month period for this sample was estimated through the use of dependent t tests. For each of the 6 domains the mean DA at the initial evaluation was compared to the mean DA obtained six months later. Table III presents the mean DAs, standard deviations, and t values for the six domains.

The results indicate that significant developmental progress occurred in four of the domains. As a group, the children achieved higher developmental scores following the six month interval in the areas of motor skills, language, social behaviors, and full scale developmental status. Conversely, no significant progress in terms of mean behavior change occurred in the cognitive or self-help areas. The most significant behavioral increase occurred in the language area and in general developmental status.

Prediction of Developmental Status with Multiple Variables

In order to determine which variables contributed significantly to later developmental status in the 6 domains, 6 stepwise multiple regressions were performed. In each analysis, the follow-up DA for that particular subscale was used as the criterion variable. The predictor variables included sex, chronological age, the given diagnostic classification, place of residency, and the initial DA for the particular domain. Results of the stepwise multiple regressions will be looked at separately for each domain (See table 4).

The results of the regression analysis involving the full scale score of the follow-up evaluation as the criterion variable indicated that two of the variables contributed significantly to the explained variability in the criterion variable. On the first step the initial full scale score was found to be a significant influence on the predictability of later developmental status. It accounted for 95.2% of the variance. On the second step sex was found to also be a significant predictor but despite the significant level ($p < .025$) it accounted for only .5% of the variance. The remaining variables, residency, diagnosis, and chronological age, did not add significantly to the explained variance in the follow-up full scale score.

In the stepwise multiple regression involving the follow-up cognitive DA as the criterion variable only one predictor variable contributed significantly to the explained variance. On the first step the initial cognitive score accounted for 93.8% of the variance. The remaining variables did not significantly contribute to the prediction of later cognitive developmental status.

The third multiple regression analysis which focused on prediction of motor developmental status was similar to the first in the sense that both the initial developmental age for the target domain and sex were the only two variations that significantly enhanced prediction. The initial motor DA was the greatest predictor, accounting for 96.5% of the variability in later motor developmental status. Although sex was statistically a significant contributor as in the first analysis it only accounted for .2% of the variability.

The fourth stepwise multiple regression examined the relationship between the predictor variables and the explained variance of the follow-up language DA. Three variables were found to be significant contributors to the predictability of current language status. At step 1, initial language developmental age accounted for 82.8% of the variability. Chronological age and sex on steps 2 and 3 explained an additional 1.2% and 1.4% of the variance, respectively. The remaining variables were not found to be significant contributors to language development predictability.

The fifth regression analysis examined the relationship between the predictor variables and the explained variance of current self-help developmental status. As with the full scale, motor, and language developmental domains the results indicate again that initial developmental status and sex were the only two significant contributors to the prediction of self-help development. The child's initial developmental status in the self-help area explained 93.8% of the variance while the sex of the child accounted for only .5% of the variability.

Finally, the last stepwise multiple regression focused on the relationship between the explained variance of the criterion variable, current social developmental status, and the predictor variables. On the first step the initial social developmental age was found to be a significant contributor to the predictability of later social developmental status (88% of the variance). The remaining variables did not significantly enhance the predictability of social development.

Discussion

1) The developmental status of the severely and profoundly mentally retarded children in this sample was found to be highly consistent over time. It seems that an individual's developmental position relative to the rest of the group remains fairly consistent.

2) The results of the multiple regression analyses suggest that psychosocial and organic factors have very little predictive influence on developmental status over a six month interval for this group of children. It was consistently found that the greatest predictor of an individual's current developmental level relative to other members of the sample is his or her developmental status at the initial evaluation. The only other predictor that consistently contributed significantly to the predictability of developmental status was the sex variable. It seems that male children are more predictable than female children in terms of developmental progress. One implication of these findings is that early intervention programs which serve to accelerate the developmental progress in a particular behavioral domain are crucial. A child's initial or early developmental status largely determines his/her relative developmental progress. Those children who are highest developmentally remain so in relation to the group.

3) Despite the high degree of consistency of developmental status these individuals are capable of significant developmental progress within a short period of time. The behavioral areas where this change was found to occur include motor, language, and social areas as well as in full scale developmental domain. This suggests that while the relative developmental status of an individual does not change over a six month period there is developmental progress for these severely handicapped

children. Furthermore, this progress can not be attributed to one specific intervention strategy but is rather a group response to a wide variety of rehabilitation efforts.

Table 1

Child Decriptive Variables

Variable	
Mean chronological age in months	60.0
Number of males in the sample	44 (62%)
Number of females in the sample	27 (38%)
Number at home	51 (72%)
Number at institution	18 (25%)
Number at other placement[a]	2 (3%)
Diagnoses	
Mental retardation	23
Mental retardation/rubella	2
Mental retardation syndrome	5
Down's syndrome	1
Mental retardation/cerebral palsy	7
Mental retardation/seizures	18
Mental retardation/cerebral palsy/seizures	15

[a] other placement refers to group home

Table 2

Correlation coefficients between initial and follow-up DA scores

Initial	Follow-up	r	p value
*C1	C2	.9454	$<$.001
M1	M2	.9705	$<$.001
L1	L2	.9046	$<$.001
SH1	SH2	.9475	$<$.001
SO1	SO2	.9411	$<$.001
FS1	FS2	.9741	$<$.001

*C=cognitive domain; M=motor domain; L=language domain; SH=self-help domain; SO=social domain; FS=full scale domain

Table 3

Initial vs. Follow-up Developmental Age Mean Scores

Domains	Initial	Follow-up	t value	one-tailed significance level
C	6.3042**	6.5775	-1.50	n.s.*
M	5.9859	6.2070	-1.74	$p < .05$
L	6.2296	6.7310	-2.73	$p < .05$
SH	7.2915	7.4451	-0.95	n.s.
SO	6.2254	6.6014	-2.45	$p < .05$
FS	6.3042	6.6831	-3.49	$p < .001$

*n.s. refers to p values that were greater than .05

**developmental age is calculated in months

Table 4

Prediction of Follow-up Developmental Age for the Six Domains

Criterion Variable	Predictor Variables	Beta	F	P	Multiple R
Full Scale DA 2	FS 1	1.0007	1390.000	<.001	.97607
	Sex	0.0790	6.802	<.05	.97827
	CA	0.0506	3.224	n.s.	.97983
	MR/seizure	0.0907	1.583	n.s.	.98054
	MR/CP/seiz.	0.0705	.001	n.s.	.98080
	Residence	0.0343	.978	n.s.	.98122
	MR	0.0505	.020	n.s.	.98138
	MR/CP	0.0253	.789	n.s.	.98144
	Rubella/ Down's	0.0194	.009	n.s.	.98157
Cognitive DA 2	C1	0.9778	1005.000	<.001	.96736
	Sex	0.0613	2.900	n.s.	.96871
	CA	0.0511	1.946	n.s.	.96996
	MR/seizure	0.0976	1.020	n.s.	.97059
	MR/CP/seiz.	0.0792	.205	n.s.	.97122
	MR	0.0659	.083	n.s.	.97179
	MR/CP	0.0282	.791	n.s.	.97198
	Residence	0.0151	.322	n.s.	.97209
	Rubella/ Down's	0.0044	.356	n.s.	.97209

Table 4 (continued)

Criterion Variable	Predictor Variables	Beta	F	P	Multiple R
Motor DA 2	M1	1.0019	1911.728	<.001	.98243
	Sex	0.0586	5.129	<.05	.98367
	MR/Seizure	0.0649	3.347	n.s	.98459
	CA	0.0346	2.361	n.s	.98541
	Down's Rubella	-0.0154	1.158	n.s	.98572
	MR/CP	-0.0071	2.227	n.s	.98597
	Residence	-0.0181	0.602	n.s	.98606
	MR/CP/Seiz.	0.0306	0.158	n.s	.98610
	MR	0.0269	6.367	n.s	.98620
Language DA 2	L1	0.9363	333.474	<.001	.91025
	CA	0.1112	4.918	<.05	.91658
	Sex	0.1246	4.638	<.05	.92420
	Residence	-0.0414	0.847	n.s	.92478
	MR/CP	-0.0099	0.798	n.s.	.92516
	Rubella Downs	0.0333	0.397	n.s.	.92541
	MR/Seizure	0.0310	0.000	n.s.	.92547
	MR	0.0256	0.545	n.s.	.92549
	MR/CP/Seiz.	0.0213	0.175	n.s.	.92556

Table 4 (continued)

Criterion Variable	Predictor Variables	Beta	F	P	Multiple R
Self-Help DA2	SH1	0.9920	1061.496	<.001	.96900
	Sex	0.0771	6.528	<.05	.97176
	Residence	-0.0625	3.667	n.s.	.97354
	MR/Seizure	0.0448	0.813	n.s.	.97392
	MR/CP	0.0237	0.180	n.s.	.97402
	MR/CP/Seiz.	0.0155	0.835	n.s.	.97404
	MR	0.0134	0.002	n.s.	.97407
	CA	0.0060	0.000	n.s.	.97409
	Rubella/ Down's				
Social DA2	SO1	0.9674	511.736	<.001	.93871
	Sex	0.0918	3.511	n.s.	.94182
	CA	0.0771	2.910	n.s.	.94516
	Rubbella/ Down's	0.0985	1.351	n.s.	.94597
	MR/CP/Seiz.	0.1435	0.092	n.s.	.94628
	MR/Seizure	0.1350	0.005	n.s.	.94669
	MR	0.1238	0.048	n.s.	.94710
	MR/CP	0.0932	0.015	n.s.	.94893
	MR/Resid.	-0.0351	0.079	n.s.	.94943

Summary of Consultant and Caregiver Evaluations of the *KID Scale*'s Use with Severely Handicapped Young Children.

Laura Bickett

Summary of Field Consultant Evaluations

120 evaluations total

Question 1 Did the KID Scale results on this child give you enough information to make out an IPP?

response	N	%
yes	78	65%
no	42	35%
blank	1	.8%

reasons for the KID Scale results not providing enough information for the consultants to make out an IPP:

1 problems unique to the child were not detected by the KID Scale, consultants found it necessary to refer to the BSID results or to make on site observations (listed on about 18 evaluations)

problem behavior and handicaps not detected by the KID Scale:

- autistic behavior
- self stimulation
- blindness
- deafness
- feeding problems
- hyperactivity
- cerebral palsy "child can do things off the Scale (toilet trained) but can't use both hands or even sit alone well"
- severe physical limitations, ie. total lack of motor control

2 KID Scales were too discrepant, consultants had to refer to BSID results (listed on about 9 evaluations)

3 child ceilinged on several Scales, necessary to refer to the BSID results (listed on about 8 evaluations)

4 necessary to refer to BSID results--no specific reasons given one consultant, "recommendations based on the KID Scale were mediated and altered by what observed of the child's behavior during the Bayley administration" (listed on about 8 evaluations)

5 child had so few skills on any Scale that an IPP was difficult (listed on about 2 evaluations)

Question 2 Did the caregivers have difficulty cooperating?

response	N	%
yes	27	23%
no	88	73%
blank	5	4%

reasons given by consultants for a yes response:

1 caregivers felt they did not know the child well enough to fill out a KID Scale--particularly teachers and therapists (listed on about 8 evaluations)

2 there were discrepancies between the KID Scales (listed on about 6 evaluations)

3 mother had to be assisted in completing the KID Scale--due to a language barrier, mental retardation (listed on about 4 evaluations)

4 teachers were late in completing the KID Scale (listed on 2 evaluations)

5 caregivers had difficulty filling out a KID Scale because the child's handicaps made them unsure of how to respond to some items (listed on 2 evaluations)

6 several blanks on the answer sheet, mothers found too hard, too depressing, aides disinterested in results--thought long term goals were too high (listed on about 5 evaluations)

Question 3 Will this proposed IPP and/or the KID Scale printout results directly affect planning for this child?

response	N	%
yes	115	96%
no	4	3%
blank	1	.8%

How?

a.) help caregiver to care for the child better--listed on 41 evaluations

b.) used in staffing at school or residence-- listed on 78 evaluations

c.) included in child's record in school, residence, or doctor's files--listed on 82 evaluations

d.) other--listed on 22 evaluations

incorporated into annual objectives and/or used in lieu of--listed on 17 evaluations

used by IHP manager or teacher--listed on 2 evaluations

used along with child's yearly psychological report--listed on 1 evaluation

reasons given for a no response to question 3: KID Scales were poorly done, caregivers appeared unwilling to try anything new

Question 4 To whom were the results of the KID Scale and the IPP made available?

response	N
teacher	107
administrator	64
nurse	40

response	N
other	56
parent	46
regional center counselor	23
IHP manager	5
therapist	4
CCW	2

Summary of caregiver evaluations of the KID Scale

Total number of evaluations completed was 210. If all caregivers had completed an evaluation there would have been 242.

Question 1 About how long did it take you to complete a KID Scale?

time	N	%
less than 30 min.	4	2%
30 min.	62	30%
45 min.	99	47%
60 min.	7	3%
more than 60 min.	28	13%
blank	10	5%

Question 2 Do you recall any items which were difficult to answer?

response	N	%
yes	115	55%
no	49	23%
blank	46	22%

For the 115 yes answers it was possible to classify the reasons given for difficulty with particular items into four general categories. These categories are presented below and under them specific items cited by caregivers are listed.

1 Caregivers most frequently cited items that dealt with home care and interactions between child and parent as being difficult to answer. Specifically, items that dealt with feeding, bathing, dressing, and responsiveness to mother or father were listed as being difficult to answer because the caregiver had not had the opportunity to observe the child in these circumstances. Items that dealt with early infant behaviors and could be answered with B-used to do the behavior but has outgrown it were also cited

as being difficult to answer because caregivers were not really certain that the child had at one time performed the behavior. In general, many caregivers had difficulty answering items either because they had not had the opportunity to observe the child in varied activities and settings or because they had been caring for the child only a short time. Approximately 37 responses to question 2 fell within this category.

2 The next most frequently cited reason for having difficulty responding to particular items on the KID Scale was that the physical handicaps of the child prevented him or her from performing the behavior exactly as stated and caregivers felt they were being unfair to the child by marking D-does not yet do, yet not totally correct by marking A-yes, can do this behavior. Specifically, caregivers had difficulty responding to an item when the child could do some approximation of the behavior, could do the behavior with assistance, or could do the behavior in an adapted manner--but not exactly as stated. There were also instances where caregivers acknowledged that the child could not perform the behavior, due to physical handicaps, yet they felt there was understanding or comprehension on the part of the child and they felt they were unduly penalizing the child by marking D-does not yet do. Approximately 29 responses to question 2 fell within this category. Examples:

#4 "plays peek-a-boo" child doesn't see, but responds to voice cues

#28 "talks in own language" child makes sounds, but not words

#14 "reaches for a familiar person"

#126 "hugs and shows affection to mother"

#141 "hugs and shows affection to father" for #14, #126, and #141--child doesn't hug or hold but has other ways of expressing affection, ie. through changes in facial expression, changes in body tone

#12 "helps in dressing by pushing arms through sleeves" on command only

#56 "tears paper using two hands" uses teeth and one hand

#145 "repeats words when asked to" sounds only

#165 "kisses adult when asked to" his type of kiss

#234 "eats sandwich cut in quarters" child eats sandwich, but not by self

#35 "tries to get attention of adult by stretching arms and reaching" gets attention in different manner

#69 "holds head steady"

#171 "picks up two small toys in one hand" difficult for child due to spasticity

#167 "sits leaning on hands"

#210 "while sitting leans forward to get objects" child does behavior in his own way

#111 "sits on your lap"

#177 "sucks and gums pretzels or cookies"

#217 "holds two things at a time, one in each hand" child can do with aide

comment of caregiver, "should be a way of recording when a child is not doing a behavior due to a physical handicap, then unrealistic goals won't be made"

3 Caregivers found some items difficult to respond to because they found them too vague. They were not sure exactly what was meant by the statement and felt the behaviors were not described specifically enough. Approximately 16 responses to question 2

fell within this category.

Examples:

#111 "sits on your lap" child initiated or adult initiated?
with or without support?

#80 "turns head freely when sitting" child sitting on own
or in a chair?

#69 "holds head steady" for how long?

#232 "holds a doll-sized object" what is a doll-sized object?

#212 "drinks from a cup held by an adult, without spilling"
with or without external lip control?

#186 "plays with hands"

#205 "babbles when alone in crib" define babbles

#10 "bounces up and down if held under arms" does child initiate
activity?

#100 "eats table foods" mashed or solid?

#131 "voice is sometimes loud, sometimes soft" crying voice or
babbling?

#65 "will move cloth placed over face" using hands or by moving
head?

#64 "rolls a ball with an adult"

#157 "rolls a ball while sitting"
what amount of accuracy is needed for a yes answer?

4 Caregivers found some questions difficult to answer because the inconsistency of the child's behavior made them unsure of how to respond. Specifically, when a given behavior was seen only very sporadically or very briefly caregivers had difficulty determining whether they should mark A-yes, can do behavior or D-no, can not do. Several caregivers wrote that the option of

marking "sometimes" or "don't know" would be helpful. Some caregivers found certain items difficult to respond to because although they had seen the child perform the behavior it was unclear to them whether or not the behavior was performed along with comprehension, intention, and awareness. Approximately 15 responses to question 2 fell within this category.

Examples:

#16 "shakes rattle placed in hand"	rattling probably due to child's spasticity
#66 "reacts when you say his or her name"	child responds to all auditory stimuli in about the same way

#72 "understands 'bye-bye'"

#90 "stops when say 'no'"

#107 "stops when yell 'no'"

hard to tell when child responding to the word or the tone of voice

miscellaneous items--listed but no reason given as to why they were difficult to respond to

4, 13, 28, 29, 19, 39, 44, 51, 53, 55, 60, 73, 75, 80, 81, 88,101-115, 133, 155, 194, 205, 218, 234, 235, 243, 248

Question 3 Were there some things that this child you care for could do that were not on the test?

response	N	%
yes	57	27%
no	115	55%
blank	38	18%

skills and abilities of children caregivers found not on the KID Scale:

1 higher level gross and fine motor skills, ie. stringing beads, working with puzzles, coloring, getting down steps, moving on a scooter board (listed on about 9 evaluations)

2 self help skills, ie. toileting, washing, brushing, dressing, feeding (listed on about 6 evaluations)

3 nonverbal (or nonlanguage) means of communication, ie. through crying, smiling, stillness, sign language, facial expressions, eye movements, and sounds some caregivers felt child was capable of communicating needs, wants, and pleasures (listed on about 11 evaluations)

4 simple gross movements, ie. while on back moves legs in random running motion, turns from right side to back while sidelined, rolls consecutively, crumples paper, attempts to reach, bats at hanging toys, swats, pulls toys to him/her, does knee stand with assistance, bears weight (listed on about 17 evaluations)

5 adaptive ways of dealing with the environment, ie. can not grasp a bottle so holds bottle by the bottom with the flat of the hand, holds cup with teeth, moves about floor by scooting on bottom, uses legs to move objects and to open and close things (compensates with feet and legs for things can not do with hands), tears with one hand, claps with one hand, gets attention by pulling self

upward (listed on about 6 evaluations)

6 ability to recognize and remember, ie. common objects (cup), holidays (Christmas), daily patterns, body parts (listed on about 5 evaluations)

7 responsiveness to tactile and auditory stimuli, ie. moves to feel another texture, reacts to different textures, receptive language skills greater than those represented on the KID Scale (listed on about 7 evaluations)

Question 4 Which of the following words best describes your experience with the KID Scale? a. frustrating b. helpful for my child c. hard to do d. interesting

some caregivers circled two or more responses

response	N	%
frustrating	30	14%
helpful	48	23%
hard	7	3%
interesting	142	68%
blank	12	6%

comments of some caregivers:

test was depressing, unfair to S/P handicapped

frustrating to give so many negative answers

hard to determine if child actually performs the behavior or not--why the test was frustrating

therapist--KID Scale inappropriate for me to complete, not enough knowledge of the child

should add to answers, e. skills emerging

Empirical Basis for the Construction of Prescriptive Programs for Severely Handicapped Young Children from the KID Scale.

Linda Sudmalis

Since the legislation of Public Law (PL) 94-142 much has been written to interpret, clarify, and expound upon this particular law. This law covers a variety of areas in regards to the right of handicapped people between the ages of 3 and 21 to be educated. The areas covered include:

1. Zero Reject - all handicapped persons must be provided with a free, appropriate public education.
2. Nondiscriminatory Evaluation - all handicapped persons must receive a full evaluation prior to being placed in a special education program.
3. Individualized Education Program (IEP) - all handicapped persons must have an IEP developed and implemented for them.
4. Least Restrictive Environment - all handicapped persons should be educated in as "normal" an environment as possible.

5. Due Process - all handicapped persons and their parents have the right to all information regarding their or their child's handicap, as well as full judicial rights.
6. Parental Participation - all parents of handicapped persons have the right to full involvement in the development of their child's program.

As PL 94-142 is divided into a number of principles, so too is the principle involving IEPs divided into what must be taken into consideration when developing a handicapped person's program. The "what" includes:

1. documenting their present level of performance.
2. developing annual goals.
3. developing short-term objectives stated in instructional terms.
4. documenting the services that will be provided.
5. indicating the amount of time that services will be provided.
6. projecting the date service is to start and the length of time it will last.

7. determining objectively whether or not short-term objectives have been achieved.

The stipulation that each handicapped child be made an IEP on at least a yearly basis has spawned a number of debates as to the feasibility of carrying out such an endeavor--that of providing each and every handicapped person between the ages of 3 and 21 with an education "specially" tailored to their needs. Savage (1977) predicted that "the logistical problems in providing these services could be awesome" (p. 54).

In general agreement with Savage's prediction, "State legislators [have] said [that] the federal law with its voluminous paperwork requirements and staggering costs - could cause a backlash against special education" (NSRPA, 1977, p. 8). The IEP has also come to be envisioned as "one of the most controversial aspects of PL 94-142....[with a dilemma emerging of how] to formulate an operational definition of the IEP that can be understood and, more important, implemented" (Aserlind & Kaye, 1979, p. 138). One person went as far as to say that the IEP is a "'positive can of worms'" (NSRPA, 1977, p. 53).

These anticipated problems stem from certain requirements in the developmental stages of an IEP such as the called for involvement of most of those who come in direct contact with a handicapped person, i.e., the special education agency, the teacher, and the parents; thus causing greater potential for disagreements during planning. More people also means more paperwork and undoubtedly more time.

In an effort to possibly reduce some of the work in IEP planning in the future, an analysis was undertaken of one of the essential components of the program. In this paper, the focus was narrowed down to deal specifically with the annual or long-term goals of a selected population of severely and profoundly handicapped children.

Prior to the development of these long-term goals, the child's current level of performance must be assessed. Hayden and Edgar (1978) list "several pertinent areas" that need to be kept in mind when assessing a child's behavior:

1. teachers must look directly and frequently at specific child behaviors.
2. materials used should contain procedures for measuring objective behaviors that are sequenced developmentally in various content areas, but always including gross motor,

fine motor (or cognitive), communication (language), social, and self-help behaviors.

3. the materials should be presented in a program specific format. (p. 70)

A number of tests are to be used to assess whether or not a person is to be placed within the category of "Special Education;" this is to guarantee nondiscriminatory evaluation.

For ease of goal-setting the long-term goals should be able to be derived from these same tests. One such assessment test, which can have items translated into long-term goals, is the Kent Infant Development (KID) Scale (Katoff, Reuter, & Dunn, 1980). This test is based on caregivers' observations of what a child in their care can or cannot do.

Part of the research done on the KID Scale involved having five consultants from five different geographical locations in the U.S. administer the test to a combined group of 120 severely and profoundly handicapped children. In addition to this, each consultant was responsible for developing an Individual Program Plan (IPP) for each child. An IPP is an IEP's correlate when dealing with a population of severely and profoundly handicapped children.

An analysis of the long-term goals from the resulting 120 IPPs was undertaken to ascertain what common goals would arise and how these goals may change as a person grows developmentally older.

The KID Scale determines the developmental age of a child within the cognitive, motor, language, social, and self-help domains. This stands in accordance with Hayden's and Edgar's aforementioned suggestion of what content areas should be covered when doing an assessment. Caregiver information that the consultants received from each child's KID Scale computer printout formed the basis of the IPPs. Behavioral items, within each of the domains, that the child was not able to perform became the long-term goals. To facilitate the process of arriving at long-term goals, a "menu" of goals was sent to each consultant to establish a format of how to proceed.

As previously stated much has been written on the interpretation and clarification of the IEP, particularly from the legal standpoint, and an equal amount of coverage has been devoted to the various aspects of implementing the law, particularly in regards to program planning.

The IEP was not meant to be an instructional plan, but rather:

> a management tool that is designed to assure that, when a child requires special education, the special education designed for that child is appropriate to his or her special needs, and that the special education designed is actually delivered and monitored. An instructional plan reflects good educational practice by outlining the specifics necessary to specially intervene in instruction....Documenting instructional plans, however is not mandated as part of the IEP requirements. (Ballard,1978, p. 5)

nevertheless many instructional programs have been outgrowths of PL 94-142.

Books such as the Education of the Severely/ Profoundly Handicapped (Gentry & Parks, 1977) present a general overview of this subject matter and lend support to the need for developing tests directly correlated to curriculum content. In fact the "curriculum should [be] data-based. Each item should be validated The ultimate question for each curriculum is 'Does it lend to the development of short and long range skills that are sought for that individual?'" (p. 52) and "the measurement system should correlate to the curriculum, we should teach and evaluate the same things" (p. 53).

Another book, the Programmed Environments Curriculum (Tawney, Knapp, O'Reilly, & Pratt, 1979) is "representtative of our increasingly precise instructional technology. This curriculum evolved from a functional analysis of concept acquisition and daily living skills. It offers highly structured programs, taught with defined, specific procedures" (p. vi).

Curricular guides such as these abound and a need exists to begin scrutinizing the outgrowths of PL 94-142 rather than continuing the re-interpretation and re-clarification of the legal jargon of this law. Lester Mann, the Editor-in-Chief of The Journal of Special Education, has stated that he "simply [wants] to reduce the work and time of IEP preparation to allow everyone to get on with special education again" (1980, p. 128).

One approach to deal with the problem of choosing among the many IEP manuals and curricula is Victor L. Baldwin's advice:

> We are encouraging people to do this - to beg, borrow, and steal whatever they can from any existing curriculum that will allow them to begin to specify more and more behaviors, arrange these behaviors in developmental order, and break out suggested tasks toward a terminal behavior...At the present time there are 40 or 50 curricula available for the severely handicapped. (1976, p. 66)

The reason behind the begging, borrowing, and stealing approach is that "people are looking for a 'cure-all,' an all encompassing curriculum that allows them not to have to think or adapt. 'Give it to me; lay out everything I have to know; and I'll cookbook it'" (1976, p. 65).

Seven years ago PL 94-142 was signed into being and five years ago Williams and Gotts (1977) noted that "curriculum development for the severely and profoundly handicapped is currently an art rather than a science. At this time, it is not possible to articulate a precise formula for developing curriculum nor to suggest which of the currently available curricula may be most viable" (p. 235). Four school years will soon have passed since the law went into full effect, therefore an effort was made here to establish a method of streamlining IEPs and their curricular counterparts, specifically in the area of long-term goals.

Further evidence of this need is that "educators are concerned that so much time will be consumed in writing the IEPs that significantly less time will be available for implementing them, particularly the 'statement of annual goals including short-term instructional objectives" (Nelson, 1979, p. v).

The same Lester Mann who called for a reduction in work and time spent on IEP preparation, expressed further sentiments in regards to long-term goals in an editorial entitled "Dr. Strangegoal" (1980) in which he satirically addresses the vagueness of some goals. "Make Johnny a friend of mine by the end of the school year; operationally [defining friend] as someone who smiles at [me]." The short-term objective and criteria was that he would "smile at Johnny 50 times in succession, during 20 school days, within a 4-month span;" criteria was met by having "smiled at Johnny 80.1478% of the time" (p. 127). In Mann's opinion "the IEP wasn't intended to be a curriculum" and by "reducing it all to a few short paragraphs simply describing educational levels and the activities subsumed under the long-term goals would make more sense" (p. 128).

With the use of such a method, time may be more productively spent on the actual educating, rather than on the planning and programming. Mann considers the IEP a worthy idea, yet finds "many of the objectives stated in IEPs obstructional rather than instructional" (p. 128). Some of this obstructiveness should be able to be alleviated without sacrificing the individual attention that was intended for each child.

Method

Subjects

The subjects of this study consisted of a sample of 120 severely and profoundly handicapped children coming from five different geographical locations serviced by five different consultants.

Initially a number of KID Scales were administered to each child by his or her caregivers. The five consultants played an instructional role in the data gathering process by informing caregivers of the mechanics of administering the test. The uniqueness of this test over others is that the information a caregiver would provide was hypothesized to be more representative of a child's behavioral repertoire than would have been information gathered by an experienced test giver. This has since proven to be the case

The wealth of information to be gained is drawn from familiarity with the child rather than from familiarity with the test.

After testing was completed the consultants filled out IPPs on their 20 to 25 children. The long-term goals were based on those areas that the computer printout from the scored tests indicated needed help, with guidelines being provided by the "menu" that had been previously sent.

Materials

The materials used in this study consisted of 120 IPPs, one for each of the children tested, see Table 1. The IPP has each of its column headings--long-term goals, entry skills, emerging skills, and activities divided into five domains--cognitive, motor, social, language, and self-help. Each long-term goal was transcribed from the IPP onto an index card in a systemized fashion utilizing colors for ease of sorting. With five domains and 120 IPPs this amounted to 600 goals, but generally a consultant listed two goals per domain thus amounting close to 1200 goals, many of which, of course, repeated themselves.

This brings up one of the reasons for the need of some type of standardization. Some program planners will state one very general goal and others will be more specific listing several goals per domain, when essentially they are setting the same goal. To illustrate this a child who is pre-ambulatory and just beginning to try and stand up could possibly have a list of goals this extensive in the motor domain:

To try and get to a standing position
To stand with support
To stand without support
To put one foot in front of the other
To take a few tottery steps
To walk into your arms when several
 feet away
To WALK

and eventually to hop, to skip, and to jump. Whether a severely or profoundly handicapped child would be able to accomplish all, let alone any of these behaviors, within a year or for that matter a lifetime is questionable. On the other hand the goal may simply be stated as, "To develop a means of locomotion." Locomotion would then have to be subjectively interpreted by the child's caregiver. All these long-term goals could be "subsumed" into the all encompassing goal of "To progress towards walking--walking being composed of all those initial skills one needs before being able to confidently stride across a room". A task analysis of walking would then provide the short-term instructional objectives along with the start of a curriculum. Activities could then be presented that would facilitate walking per se. A streamlined walking program is then the final result, with adaptations and allowances made for specific handicaps.

Procedure

To arrive at streamlined goals an elaborate sorting system was devised. Each index card, in addition to the transcribed long-term goal, had the child's developmental age for whatever domain that card represented. The child's full scale developmental age and diagnoses were recorded as well, as was his or her identification number (ID#).

The cards were first sorted by colors into their respective domains: cognitive, motor, social, language, self-help. The next step involved sorting the cards within each domain in order by the developmental age level for that domain. The developmental age range was 1.0 - 15.9 months. A child may have a cognitive age of 1.8 months, a motor age of 1.9 months, a social age of 3.0 months, a language age of 4.7 months, a self-help age of 6.0 months, and a full scale age of 3.1 months; therefore with 120 children, each having a different developmental age per domain, there resulted the following distribution as shown in Table 2.

Insert Table 2 about here

Once this was in order then the cards for each month within each domain were categorized. Categories were determined by noting which long-term goals kept repeating themselves. Just as when confronted with any sorting task, categories were subjectively made, with allowances made for certain goals. Goals that did not quite fit into pre-established categories were stretched and/or squeezed to fit, so that several categories per domain would be the end result rather than a stack of 1000 or so separate goals. Most goals did not have to undergo this stretch and/or squeeze process as they were verbatim the category title, e.g., see Appendix B.

As a safety precaution, after categorizing, the goals were transcribed onto sheets of paper as shown in Appendix A. This was done to safeguard against fairly similar goals with the same ID# from being counted twice within one category, e.g., one child (ID# 5019) with a developmental age (DA) of 2.0-2.9 months has goals of "Increase grasping" and "Increase object interaction" within the motor domain, both of which can be subsumed under the goal "Manipulate own hands and/or objects." This procedure was repeated for each category under each DA within each domain.

The final product was a series of charts, one for each domain, listing the categories, or rather the streamlined goals, and the number of times each was mentioned as an important goal within each month.

Results

Thus between 200 and 250 goals per domain were consolidated into about 20 streamlined goals per domain. Tables 3 through 7 list all the finalized goals and the frequency of their being considered important at certain age levels by the five consultants. Certain goals can be seen to develop distinct trends, e.g., the motor activity of "To develop and increase head control" is mentioned as a goal:

17 times for those with a DA of 1 month
7 times for those with a DA of 2 months
5 times for those with a DA of 3 months
3 times for those with a DA of 4 months
1 time for him/her with a DA of 5 months

and thereafter it is not considered as an important goal. Other goals may not be in as sequential an order as developing and increasing head control is, but one is still able to determine what goals should be emphasized within each domain. Goals that are mentioned on and off throughout the given developmental age range, can be encouraged up to and beyond 15 months, e.g., some normal adults could still benefit from an "Increase [in] frequency of vocal play" in hopes of establishing a balance between their expressive and receptive language skills. While head control can be seen as being a very age specific goal, vocal play spans all the ages; for once one has achieved head control there is little more that can be done to refine it, whereas higher language skills can be continuously refined.

Regardless of the domain, some goals take priority over others, while some remain isolated cases. Several of the most important goals within each domain will now be further examined.

Insert Table 3 about here

Cognitive

"Respond & attend to varied stimuli" is important in the first few months of life and not after, or rather it is not considered as being of primary importance. Responding and attending are to be encouraged and reinforced, especially during these early months for from this stem all other interactions with the outside world. After four months this behavior should be fairly commonplace.

"Manipulate own hands and/or objects" is emphasized during the first four months as well. An infant progresses in refining his/her finger dexterity, and eye and hand coordination by learning first to reach and grasp, and later to become adept at manipulating smaller and smaller objects; it is the same skill at various stages of refinement. The ultimate goal is for the infant to properly use his/her hands and fingers. This starts with an infant first recognizing that he/she has hands and fingers, and then developing midline skills, and then using them to reach out and manipulate things in the environment.

"Functional use of objects/plays" is essentially the same as the previous goal of "Manipulating own hands and/or objects," but at higher skill levels. Once a child masters those preliminary skills, he/she can then learn how to functionally use those same objects. "Plays" is included for the reason that manipulating a toy is not necessarily the same as playing with it. Most play consists of using toys appropriately, i.e., Barbi dolls are meant to be "played" with, not for clobbering brother or sister with.

This final goal spans the ages for it takes time to refine a skill. "[Coloring] within the lines" is subsumed under this category heading at the 14 month level. Coloring has its origins in the early months when an infant first learns to simply hold a crayon instead of eating it, after which he/she learns to scrawl on paper and nearby walls, and then becomes a determined scribbler, and finally arrives to the point where he/she can be considered proficient in the art of crayon coloring. It is not that an infant can be given a crayon for the first time at 14 months and be expected to color within the lines. All types of skills follow this similar line of progression.

"Develop concept of object permanence" is another goal spanning the range of ages. This may possibly be attributed to the degree that memory has developed. An infant may not be able to completely understand the abstract concept of someone or something existing when not readily in view, but this understanding is gradually brought about by the constant appearance, disappearnce, and eventual reappearnce of those people and things the infant usually comes in contact with.

"Imitative actions" achieve prominence in the middle of the first year. Immediately after an infant is capable of responding and attending the next logical step would be that he/she imitates that which has been attended to. The data uphold this, for emphasis on the goal of "Responding & attending to varied stimuli" drops off as soon as "Imitative actions" picks up. It is not that the former goal is no longer a valid goal, but rather that it has been incorporated into a goal of seeing and doing, instead of just seeing.

Insert Table 4 about here

Motor

In the motor domain the patterns of behavioral development are more distinct than within the cognitive domain, most likely because they are much more observable.

"Hand coordination/object manipulation" is first recommended as a long-term goal for those in the first month of development and continues being recommended throughout the first year. In essence it is the same as the cognitve goal of "[Manipulating] own hands and/or objects."

"Maintain range of motion in extremities" receives its heavy emphasis in the first three months. Movement must be encouraged so that atrophy does not set in from lack of use. All later behaviors are dependent on being able to use one's arms and legs.

"To develop and then increase head control" was earlier cited as an example of a goal with a very distinct pattern. Its highest emphasis is in the first three months, with over 50% of the infants at that motor age having it as a long-term goal. Thereafter it dwindles down, and by the sixth month it is no longer mentioned. Therefore, it should be noted to place immediate emphasis on behaviors that are mentioned only in the very first few months.

"Developing means of locomotion" is listed as a goal between two and nine months. Locomotion here is defined as the basic exploratory movements that enable an infant to familiarize him-/herself with the environment beyond the area occupied by his/her own body. This can consist of rolling, stretching, reaching out, and eventually crawling--basically any gross motor movements prior to actual walking.

This goal is one in which some of the original goals are stretched or squeezed to fit. Leeway is given until walking and standing are mentioned often enough to be considered goals in their own right.

From the most common position of an infant, that of lying, comes the next most logical goal, "To elevate self from prone position". This goal is only mentioned in the very first month. Once elevated, "To be able to sit" is the next goal to be considered and this is mentioned up until the eighth month. After sitting comes "Learning to stand and/or walk," a goal which first achieves notice at five months and is to be emphasized through the remainder of the first year.

Insert Table 5 about here

Social

Some of the goals within the social domain closely correspond to those in the cognitive domain, namely "Respond & attend to people (or varied stimuli)" and

"Imitates (or Imitative actions)." This fact illustrates that many behaviors cannot be strictly contained within one category, much overlap exists. Many of the social goals integrate skills from the cognitive, language, and motor domains, for much of what occurs in a social interaction involves remembering, communicating, and doing, respectively. For instance with "[Waving] bye-bye" an infant has to remember at what time it is appropriate, should understand somewhat that it is signalling the close of an interaction, and has the coordination and strength to wave.

In the case of "[Responding & attending] to people," people are a specific source of stimuli rather than the general stimuli listed in the cognitive domain. People are the other half of a social exchange. As in the cognitive domain, once an infant has been responding and attending in this case up to eight months, they can much more easily "Imitate" that which has been attended to.

"Follows simple commands" is another important goal. Once some type of communication has been established, an infant can be directed to "Do this" or to "Do that," after the adult has demonstrated what he/she wants done. Also at this point a child gains understanding of such negative instructions as, "No," "Leave alone," and "Stop that."

"Dyadic exchanges" and "Dyadic play/playing games" are almost one and the same except that there is more involvement in playing than there is in simple exchanging. These two goals together span the entire first year which can be expected since most of later social behavior involves taking turns as taught in the very simplest games of one's early childhood, e.g. peek-a-boo, and pat-a-cake.

"Understands concept of ownership" is a goal which involves some cognitive processes and is mentioned more at the end of the first year. An infant develops an understanding that all in the world is not his/her sole possession, that there are others who may have a claim on some of the things out there. This is also a part of the give and take, or the sharing, involved in a social interaction.

Insert Table 6 about here

Language

All along the developmental continuum language can be used as encouragement to facilitate the acquisition of other behaviors. For the most part much of our social existance is dependent upon how highly developed our language skills are--and if an infant is deaf, he/she will sadly be hampered in many areas of social and language development, yet then the motor skills involved in making gestures and overt facial expressions can be used to compensate for lack of vocalizing--for langauge need not be strictly vocal.

"Increase frequency of vocal play (both expressive & receptive)" spans the entire year, but is particularly emphasized in the first months. This is when an infant begins to realize that he/she can make sounds, and later that these sounds can bring about wanted changes in his/her environment, i.e., hugs, dry vs. wet diapers, and food.

Under this goal is subsumed the goals of "Increase vocalizations," "Increase receptive language," "Increase expressive language," and "Frequent & responsive vocalizations." Though language is dichotomized into receptive and expressive, they are both included here because the heading is "...vocal play," with play being defined as the volley of communication that occurs between a caregiver and an infant regardless of how primitive it may be. "Increase frequency of vocalizations" may have possibilities as a goal in its own right, but vocalizations merely for the sake of making noise soon advance into making noise to achieve some ends, particularly attention, and thus a "language" has been formed between caregiver and infant.

"Vocal imitation" is to the language domain as "Imitates" is to the social domain and "Imitative actions" is to the cognitive domain. Spanning the first year, "Vocal imitation" is more strongly emphasized in the earlier months than imitation in the other domains, possibly due to the fact that for infants echoing the babbling of their caregivers is initially easier than copying the actions or the games adults play with them.

"Recognizes words & names" is a goal that an infant advances towards when he/she begins to distinguish and remember particular "words" or "names" out of the general deluge of words and names that fall on an infant's ears. This occurs throughout the first 10 months, but particularly early on.

"[Communicating]--pain & pleasure, needs & wants, yes & no" are all separate succinct goals conveying different messages, which are dependent on the skill level of the infant. "Communicates pain & pleasure" is recognized the most in the very first month when it probably is the extent of an infant's language repertoire, i.e., tears conveying the pain of a hungry tummy, a wet diaper, or loneliness, and cooing conveying the pleasure of a full tummy, a dry diaper, and having someone near.

"Needs & wants" are mentioned more often a little further down the age line since a specific need is now being communicated, rather than a general emotion such as pain. The language between caregiver and infant has been somewhat refined.

"Yes & no" is only listed twice, but it warrants mentioning in that by the time this goal is reached an infant's comprehension of certain words has further increased. He/she need not understand the words "pain & pleasure," or "need & want" to convey them, but "yes & no" does demand some understanding. This skill, once attained, better enables an infant to make choices about what happens to him/her.

"Speaks one or several clear words" is highlighted after the middle of that first year. Once verbal skills have developed and an infant is capable of mimicking another's words, then the caregiver can await the much hoped for "ma-ma" or "da-da," especially when spoken on the infant's own initiative.

"Follows simple commands" follows the same principle as it did when under the social domain, which is that once understanding has been reached an infant can be instructed to do this or that--which leads us into the self-help domain where goals such as "To progress towards feeding by mouth" are aided by "simple commands" such as "Open wide."

Insert Table 7 about here

Self-help

As with the motor domain, the goals listed here are much more distinctive, because self-help behaviors are more easily observed. It is easier to "see" someone "[Drinking] from a cup" than it is to see him/her "[Developing the] concept of object permanence."

"To progress towards feeding by mouth" relates to skills such as holding food in one's mouth, chewing it, and then swallowing it. This is mentioned mainly on the first half of the year.

"To approach & enjoy eating" is that point at which an infant considers eating a pleasurable experience, not a painful one. Under this goal are subsumed such goals as "Accepts a variety of food w/o resistance" and "Participation in feeding." This goal receives emphasis at the same time as the previous goal, because the more an infant enjoys food the sooner he/she will progress "towards feeding by mouth," and later "[Self-feeding]."

"Learns to use cup & utensils" more or less spans the ages. As with the crayon example in the cognitive domain, an infant begins by just holding the object, or assisting someone else holding it, and eventually to appropriately use it.

"Drinks from a cup" is considered to be a step higher than "Learns to use cup & utensils", though it could have been under one goal, but it was so frequently mentioned by itself in comparison to "Picks up cup," "Holds cup" and "Assist in using utensils" that it warranted being a separate goal. This also spans the first year.

"Self-feeds" is particularly emphasized from the sixth through the eighth month with 75% or more of the infants at those age levels having it as a goal. This goal is a continuation of all previously mentioned self-help goals.

"To participate in dressing & undressing" runs across the board. As with other skills, an infant begins by assisting the removal of his/her arm from a sleeve, and later putting on the whole shirt by him-/herself.

"To be toilet-trained" and "To help wash/cleanup one's self" receives notice at the end of the first year. These two goals cover such behaviors as learning to use the toilet, wiping his/her face after eating, combing his/her hair, and helping, rather than hindering, the caregiver during bath time.

Discussion

Approximately 1200 goals dispersed over five domains were reduced to about 10-20 goals per domain, with most of the duplicates being incorporated into more encompassing goals. Thus Tables 3 through 7 can be utilized as a short-cut in developing future IPPs for severely and profoundly handicapped infants and feasibly reduce the time spent.

Shortcomings

Of all of the DAs under all of the domains none has a sample size greater than 25 and the mean sample size per domain is 8. In Table 2, note that 3/4's of the DAs under each domain have sample sizes of eleven or less. In light of this, one should consider having larger sample sizes per each DA level than were available in this study, so that a more accurate reflection of what happens at each particular month can be gotten.

Five consultants, influenced by the "menu" of goals sent them, can be expected to be slightly biased in their goal-making. Yet having more consultants would probably only result in even more duplications since the repertoire of a severely or profoundly infant is quite limited. These duplications while adding support to the final goals, also would create a larger, more chaotic, stack of goals to be dealt with.

The tables are limited in their utility in that only the long-term goals were analyzed. The other column headings of the IPP chart--entry skills, emerging skills, and activities, also could undergo a similar sorting process.

Implications

In spite of the shortcomings, the method of sorting could be used to determine what the most commonly mentioned goals, or whatever may be chosen to be scrutinized, and when they ought to be stressed in an infant's developmental training.

Sorting was done here with the long-term goals so that it could also be determined exactly which goals need to be attended to right from the very start of an infant's life. "If there is one truism of special education, it is the earlier the handicapped child is served, the better. Profoundly retarded or other severely handicapped children need special attention in learning to feed and care for themselves" (NSPRA, 1977, p. 48). Although PL 94-142 does not mandate education for those younger than three years, some of the outgrowths of the law do focus on development starting at birth, for education need not and should definitely not be postponed until the child reaches the "legal" age of three years, especially with the population under consideration here.

As with all other studies, research must be furthered to the point were a comprehensive manual detailing all the long-term goals and the activities helpful to acquiring them would be the ultimate outcome from this preliminary research; a manual in which goals are directly linked into an infant's assessments and nondiscriminatory evaluations.

Tables

Tab 1

Individual Program Plan for ______________________ Child's name Date __________ today

By ______________________ field consultant ______________________ day-time caregiver ______________________ evening caregiver

DOMAIN	LONG TERM GOALS	ENTRY SKILLS	EMERGING SKILLS	ACTIVITIES
COGNITIVE	Respond to varied auditory and tactile stimuli	Reacts to and is startled by sounds	Smiles to sounds	Musical mobile in crib Infant stimulation over all modalities
MOTOR	Make spontaneous movements of limbs	Turns head freely	none noted	Have adult hold on lap and rock Hydrotherapy Manually move limbs
SOCIAL	Respond to voices, tactile stimulation	Smiles Enjoys tactile stimulation physical play	Reacts to name, voices	Personal physical care Encourage holding and rocking her
LANGUAGE	Communicate pleasure and pain Receptive to name	Reacts to voices Whimpers	Reacts to name makes two sounds	Talk and sing to touch rythmically Use name to greet Reinforce any means of communication
SELF-HELP	Eat soft food	Drinks from a cup held by adult	Eats mashed foods	Continue feeding by mouth Try varieties of soft, mashed foods

Revalidation Date (6 months from today) ______________________

Table 2

Distribution of Developmental Ages in 5 Domains

DA	COGNITIVE	MOTOR	SOCIAL	LANGUAGE	SELF-HELP
1.0 - 1.9	31	29	14	19	14
2.0 - 2.9	7	13	16	4	4
3.0 - 3.9	14	9	4	16	4
4.0 - 4.9	11	8	20	10	25
5.0 - 5.9	7	11	6	7	3
6.0 - 6.9	1	6	7	12	19
7.0 - 7.9	7	4	13	14	6
8.0 - 8.9	12	6	13	11	4
9.0 - 9.9	4	7	5	11	3
10.0 - 10.9	10	10	9	9	7
11.0 - 11.9	1	5	7	4	1
12.0 - 12.9	0	4	2	2	19
13.0 - 13.9	4	5	4	0	12
14.0 - 14.9	9	3	0	1	0
15.0 - 15.9	2	0	0	0	0
	120	120	120	120	120

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Table 3

Frequency of cognitive goals over the first 15 months of life	N = 31 +	7 +	14 +	11 +	7 +	1 +	7 +	12 +	4 +	10 +	1 +	0 +	4	+ 9 +	2 = 120
	DA = 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Respond & attend to varied stimuli	17	4	7	1											
Manipulate own hands and/or objects	7	4	6	4											
Functional use of objects/ plays	4		4	6	2	1	5	7	3	6	1		4	6	
Develop concept of object permanence	3		3	4	2		1	5	2	4			1	1	1
Imitative actions					1	1	1	6	1	6				4	
Ability to attend to & complete short-term tasks							1		1	2				2	
Visual tracking	4	1	3	2											
Localize sounds	3		2	1											
To gain greater control of environment					3		2	2							
Obtain vision and/or hearing evaluations	5	1													
Interested in mirror images	1	1													
To develop greater self-awareness			1	1											
Concentration/Active thought processes					2		1	2	1	2					1
Pain avoidance						1									
Ceiling on KID Scale														1	1

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Table 4

Frequency of motor goals over the first 15 months of life	N = 29 +	13 +	9 +	8 +	11 +	6 +	4 +	6 +	7 +	10 +	5 +	4 +	5 +	3 +	0 = 120
	DA = 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hand coordination/ object manipulation	11	8	5	6	11	3	3	4	2	8	4	2	4	3	
Maintain range of motion in extremities	7	1	2												
To develop & then increase head control	17	7	5	3	1										
Developing means of locomotion	4	5	3	6	3	3	3	3	3						
To elevate self from prone position	3														
To be able to sit	10	7	3	3	6	3	3								
Learning to stand and/or walk					4	2	1	3	6	7		1	1		
To increase postural control	4	2	2							2	2	2	2	3	
To climb													1		
Ceiling on KID Scale											1	1		1	

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Table 5

Frequency of social goals over the first 15 months of life	N =	14 +	16 +	4 +	20 +	6 +	7 +	13 +	13 +	5 +	9 +	7 +	2 +	4 +	0 +	0 = 120
	DA =	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Respond & attend to people		9	12	3		2	5		3							
Imitates		1			2		3	8	4	3	3	4	1			
Follows simple commands			1			4	1	2	3		1	1		2		
Dyadic exchanges		7	6	2	8											
Dyadic play/playing games					7	3	1	4	7	2	8	4	1	3		
Plays with objects			1				1	2	2	1						
Understands concept of ownership					1					1	2	2	1			
Waves bye-bye								4	1			1				
Recognition of people		1	2		6											
Increase frequency of vocal play			1		3											
Interested in mirror images			1		2											
To develop self-awareness						1			2							
Knows his/her name					2											
Learning to talk							1									
Gives feedback								2								
Initiates social interaction								1								
Cooperative									1							
Has attention getting devices											1					
Is affectionate												1				
Responds to social reinforcement													1			
To show negative affect														1		
Ceiling on KID Scale												1		1		

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Table 6

Frequency of language goals over the first 15 months of life	N = 19 +	4 +	16 +	10 +	7 +	12 +	14 +	11 +	11 +	9 +	4 +	2 +	0 +	1 +	0 = 120
DA =	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Increase frequency of vocal play (both expressive & receptive)	10	3	14	9	4	7	4	5	6	3	1	1			
Vocal imitation	3	1	5	2	3	5	7	5	4	2	2			1	
Recognizes words & names	6	1	6	2	1		5	3		1					
Follows simple commands		1	3			5	6	2	4	4	3	1			
Communicates needs & wants	1	1				1	2		2	4					
Localize sounds	2	1	2												
Speaks one or several clear words					1	3	3	4	2						
Communicates pain & pleasure	6					1									
Able to indicate yes or no					1										
Communicates nonverbally			1				1	2			1				
Increase use of labels										1		1			
Makes choices							1								
Recognizes objects											2			1	
Gives feedback				1											
Pairs sounds together				1											
Recognizes familiar people				1											
Obtain hearing evaluation			1												
Use voice to show emotions					2										
Understands the meanings behind words					1				2						
Ceiling on KID Scale												1			

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Table 7

Frequency of self-help goals over the first 15 months of life	N = 14 +	4 +	4 +	25 +	3 +	19 +	6 +	4 +	3 +	7 +	1 +	19 +	11 +	0 +	0 = 120
DA =	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
To progress towards feeding by mouth	5		3	7	2	2		1				1			
To approach & enjoy eating	9	4		16		2									
Learns to use cup & utensils		2		5	1	6	3			1		4			
Drinks from a cup	3		2	8		8	2								
Self-feeds				4		15	5	3	3	5	1	4	5		
To participate in dressing & undressing	3	2	2	5	1	9	5	2	3	6		14	8		
To be toilet-trained						1						2	2		
To help wash/cleanup one's self								1	2	2		7	5		
Accepting of a variety of foods									1	2					
Can feed self in a social situation												5			
Can take care of own basic needs												1			
Ceiling on KID Scale												1	3		
- - - - - - - -			1					1							

Appendix A

Appendix B

Cognitive long-term goals

N=31...children whose developmental ages are 1.0-1.9 months

31 IDs	50 goals
5001	2
5020	1
5061	2
5065	2
5066	2
5068	2
5069	2
5070	2
5072	2
5101	1
5110	2
5112	2
5114	2
5151	2
5155	2
5156	2
5159	2
5164	2
5174	1
5175	3
5200	1
5207	1
5211	1
5217	1
5221	1
5222	1
5224	2
5225	1
5226	1
5227	1
5228	1

Respond & attend to varied stimuli (17 IDs)

5001 { Attend to auditory stimulus for at least one minute
Attend to visual stimulus for at least one minute

5020 Increase recognition & attention of auditory & visual stimuli

5065 Provide sensory experiences

5156 Become more aware of physical environment (e.g. recognize common sounds)

5159 Work (move body) to see something, i.e. seek out stimulation & understand how to effect change

5164 { Show greater familiarity with objects, people, sounds with which she has contact
Show increased interest in motor & sensory experiences (e.g. looking at, mouthing, touching, & grasping objects, turning to sound, etc.)

5200 Respond & attend to varied stimuli

5207 Respond & attend to varied stimuli, i.e. sight, sound, smell, movement

5211 Respond & attend to varied stimuli: sound, sight, smell

5217 Respond & attend to varied stimuli - touch, auditory

5221 Respond & attend to varied stimuli, sights, sounds, smell, touch, movement

5222 Associate experiences through tactile & auditory, rather than visual means

5224 { Respond & attend to auditory & tactile stimuli
Associate experience with auditory, tactile stimuli

5225 Respond & attend to varied stimuli (auditory, tactile, visual)

5226 Respond & attend to varied stimulation (sight, sound, smell, touch, movement)

5227 Respond & attend to varied stimuli (sights, sounds, smell, touch, movement)

5228 Respond to varied auditory & tactile stimuli

Manipulate own hands and/or objects (7 IDs)

5061 Reach for objects

5066 Attend to objects

5070 To engage in simple finger & hand manipulation in play

5114 { Picks up objects & visually examines them
Tries to catch moving objects

5155 { Responds to object placed in front of, or touching her, by looking, grasping and/or bringing to mouth
Plays with hands making them touch each other

5174 To observe her own hands moving & to notice & be more attentive to objects found in front of her

5175 { To observe his own hands moving
To grasp & release objects placed in his hands

Obtain hearing and/or vision evaluations (5 IDs)

5065 To obtain vision & hearing evaluation
5066 Obtain vision & hearing evaluations
5068 Secure vision & hearing evaluation
5069 To obtain vision evaluation
5072 To evaluate vision

Functional use of objects/Plays (4 IDs)

5070 To manipulate a sound toy placed in his hand
5101 Simple play with toys, e.g. ball, rattle, squeak toys
5110 Playing with two objects at a time
5151 Play with objects purposefully

Visual tracking (4 IDs)

5061 Eye track moving objects
5068 Following movements with eyes
5112 Good visual tracking
5159 Increased gazing

Develop concept of object permanence (3 IDs)

5110 Object constancy, looks for things hidden or lost
5151 Develop "object permanence" knowing that objects exist even tho they aren't touching him
5175 To observe objects intently

Localize sounds (3 IDs)

5069 To localize sounds
5072 To localize sounds
5156 Seek common sounds out by turning her head

Show interest in mirror image (1 ID)

5112 Interest in her mirror image

N=7...children whose developmental ages are 2.0-2.9 months

7 IDs	13 goals
5013	...2
5019	...2
5021	...2
5067	...2
5116	...3
5202	...1
5223	...1

Respond & attend to varied stimuli (4 IDs)

5013 Increase attention & recog. of aud. & vis. stim.
5021 Increase recognition of aud. & vis. stim.
5202 Respond & attend to varied stimuli
5223 Attending to varied stimuli

Manipulate own hands and/or objects (4 IDs)

5013 Inc. object interaction
5019 {Increase object interaction
{Inc. grasping
5021 Inc. object interaction
5116 {Brings objects close to mouth & otherwise explore them
{Reach for objects

Obtain hearing and/or vision evaluations (1 ID)

5067 Obtain vision & hearing evaluation

Visual tracking (1 ID)

5067 Eye track objects

Show interest in mirror image (1 ID)

5116 Smile at mirror image

N=14...children whose developmental ages are 3.0-3.9 months

14 IDs	28 goals
5005	3
5012	2
5051	2
5055	2
5062	3
5105	2
5111	3
5115	1
5161	2
5176	1
5205	3
5210	2
5216	1
5219	1

Respond & attend to varied stimuli (7 IDs)

5005 {Attend to auditory stim. for at least 1 min.
Attend to visual stim. for at least 1 min.
5012 Inc. attn. & recog. of aud. & vis. stim.
5111 {Tries to touch moving object
Enjoys looking out window
5176 To learn more about objects by reaching for them more often, dropping them & listening to their sounds
5210 Attend to varied stimuli
5216 Attend & respond to varied stimuli
5219 Induce to become more interested in his environment & to increase his attention span

Manipulate own hands and/or objects (6 IDs)

5005 Move toys placed in hands
5012 Inc. object interaction
5055 Manipulate objects appropriately
5062 To reach for objects
5105 Coordinated & persistent reaching & grasping
5161 To increase knowledge of objects' characteristics, e.g. be able to catch a moving object, drop toys & watch them fall

Functional use of objects/Plays (4 IDs)

5105 Simple play with toys
5115 Simple play with some toys that require pressure to activate
5205 Use of objects functionally
5210 Use of objects in a functional manner

Visual tracking (3 IDs)

5051 To follow moving objects (visually)
5062 To eye track objects
5111 Tries to move body to see something better

Develop concept of object permanence (3 IDs)

5051 To develop concept of object permanence
5055 Develop concept of object permanence
5205 Achievement of object permanence

Localize sounds (2 IDs)

5062 To localize sounds
5205 Attach auditory meaning to experience

To develop greater self-awareness (1 ID)

5161 To develop greater self-awareness, e.g. play with own feet, watch own hands moving

N=11...children whose developmental ages are 4.0-4.9 months

11 IDs	21 goals
5023	3
5056	3
5059	1
5103	2
5106	2
5160	2
5167	4
5172	1
5203	1
5212	1
5220	1

Functional use of objects/Plays (6 IDs)

5023 Use objects functionally developing varied schema
Play with dolls
5103 Play with simple toys (e.g. rattle, bell)
5106 Play by self
5167 Shake rattle placed in hand
5203 Use objects functionally developing varied schema
5220 Functional use of varied schema with objects

Manipulates own hands and/or objects (4 IDs)

5023 Reaches for objects
5056 Reach & grasp
Reaches for objects that are out of reach
5160 Become more involved with objects, e.g. touching, shaking, grasping
5167 Reaches for objects

Develop concept of object permanence (4 IDs)

5023 Look for fallen objects
5059 To acquire concept of object permanence
5103 Object constancy
5106 Object constancy

Visual tracking (2 IDs)

5056 Track moving objects
5167 Move to see something better

Develop greater self-awareness (1 ID)

5167 Play with hands & feet

Respond & attend to varied stimuli (1 ID)

5212 Respond & attend to varied stimuli

Localize sounds (1 ID)

5056 Localize sounds

N=7...children whose developmental ages are 5.0-5.9 months

7 IDs	13 goals
5015...	3
5063...	2
5074...	2
5102...	2
5157...	2
5165...	1
5206...	1

To gain control over environment (3 IDs)

5015 Obtain objects not in close proximity
5074 To obtain toys out of reach & out of sight
To obtain & close simple containers
5157 "Works at" getting objects which are out of reach or partly hidden

Develop concept of object permanence (2 IDs)

5063 To obtain concept of object permanence
5206 Object permanence or evidence of memory

Functional use of objects/Plays (2 IDs)

5063 To manipulate objects purposefully
5102 Block building, stacking
Completing peg boards, form boards

Concentration/Active thought processes (2 IDs)

5157 Will look at/study an object or activity for a prolonged period
5165 Develop strategies to learn more about objects, e.g. reach/touch objects, then grasp/bring to mouth/look at/ or drop & watch them fall

Imitative actions (1 ID)

5015 Imitates scribbling
Imitates simple games, like pat-a-cake

N=1...child whose developmental age is 6.0-6.9 months

1 ID	3 goals
5109...	3

Pain avoidance (1 ID)

5109 Avoiding objects that might give pain

Functional use of objects/Plays (1 ID)

5109 Scribbling by self

Imitative actions (1 ID)

5109 Imitating actions of adults

N=7...children whose developmental ages are 7.0-7.9 months

7 14
IDs goals
5107...2
5153...2
5158...3
5166...2
5168...2
5213...2
5215...1

Functional use of objects/Plays (5 IDs)

5107 Simple play with dolls, stuffed animals

5166 More consistent involvement in seeking experiences with objects
Greater sophistication in ways of playing with objects

5168 Seek objects to explore (reach, grasp, observe)
More sophisticated object use (e.g. drop & pick up toys, hold a variety of objects

5213 Use objects functionally with varied schema appropriate to different objects

5215 Functional use of objects, by developing varied schema appropriate to objects

To gain control of environment (2 IDs)

5153 "Work" to get favorite toys by moving body, uncovering, avoiding obstacles

5158 "Works" to get at objects by uncovering them & overcoming obstacles
Uses right arm to "hold" object against body

Develop concept of object permanence (1 ID)

5107 Object constancy

Imitative actions (1 ID)

5153 Imitation of social games

Concentration/Active Thought Processes (1 ID)

5158 Understands "cause & effect"

Ability to attend to & complete short-term tasks (1 ID)

5213 Attend to short term tasks

N=12...children whose developmental ages are 8.0-8.9 months

12 26
IDs goals
5007...2
5008...2
5014...3
5108...2
5117...2
5118...2
5152...3
5154...2
5162...3
5163...2
5181...1
5214...2

Functional use of objects/Plays (7 IDs)

5007 Color

5108 Play alone appropriately

5117 Simple play with toys, e.g. Busy Box

5118 Use objects functionally

5162 To know more about different things that can be done with different objects (e.g. squeeze toy)
To be more engaged with objects (e.g. drop 1 of 2 toys to pick up a 3rd)

5163 To use more objects in a conventional fashion (e.g. a bag or box for carrying, doll for feeding & rocking)

5214 Use objects functionally

Imitative actions (6 IDs)

5007	Imitates the actions of adults
5008	Imitate games, i.e. pat-a-cake Imitate actions of adults
5014	Imitate simple games
5108	Imitate familiar actions of adults long after they occurred
5154	Develop symbolic thinking, e.g. imitation, doll-play
5163	To imitate actions, routinized games, sometime after they have been observed

Develop concept of object permanence (5 IDs)

5014	Search for objects not in immediate reach Reacts to famil. objects
5117	Evidence of memory or object permanence
5118	Object permanence
5162	Recognize old vs. new objects
5214	Develop object permanence

Concentration/Active thought processes (2 IDs)

5152	Understands "cause & effect"
5154	Broadened understanding of cause & effect

To gain control of environment (2 IDs)

5121	Ability to attend to short-term problem-solving task & to complete it
5152	Makes desires & preferences known to adults Is assertive & active in getting toys that she wants

N=4...children whose developmental ages are 9.0-9.9 months

4 IDs	8 goals
5002...	2
5006...	3
5119...	2
5208...	1

Functional use of objects/Plays (3 IDs)

5002	Will use a second object in obtaining/caring for a first object
5006	Scribble
5119	Appropriate play with toys (e.g. colors, stacks, blocks etc.)

Develop concept of object permanence (2 IDs)

5006	Search for hidden, lost toys
5119	Achievement of object permanence

Imitative actions (1 ID)

5002	Imitate adult activities in play

Ability to attend to & complete short-term tasks (1 ID)

5208	Ability to attend to short term tasks & complete

Concentration/Active thought processes (1 ID)

5006	Understanding meaning of prepos'd, i.e. up & down

N=10...children whose developmental ages are 10.0-10.9 months

10 20
IDs goals
5003...2
5053...3
5057...3
5064...2
5073...2
5123...2
5170...2
5171...2
5201...1
5204...1

Imitative actions (6 IDs)

5003 Imitate adults' actions
5053 Imitate simple actions of adult
5057 Imitate simple actions
5123 Imitates simple actions of others
5170 More sophisticated imitation skills (range of actions, imitation after time lapse)
5171 Imitate actions of adults long after they have occurred

Functional use of objects/Plays (6 IDs)

5053 Play appropriately with toys
5057 Play appropriately with objects
5064 To manipulate objects purposefully
5073 To play appropriately with toys
5170 Know more about special characteristics of objects (carry toys in container, know special actions to use with objects)
5171 Expand repertoire of play strategies with objects. Use a container to carry things.

To develop concept of object permanence (4 IDs)

5003 Search for lost objects
5064 To acquire concept of object permanence
5073 To develop concept of object permanence
5123 Object constancy

Ability to attend to & complete short-term tasks (2 IDs)

5201 Ability to attend to & complete short term tasks
5204 Ability to attend to short term tasks & complete them; activities

Concentration/Active thought processes (2 IDs)

5053 Match objects & pictures
5057 Match objects w/ pictures

N=1...child whose developmental age is 11.0-11.9 months

1 1
ID goal
5124...1

Functional use of objects/Plays (1 ID)

5124 Functional use of objects & toys, e.g. crayons to color, blocks to build

N=0...children whose developmental ages are 12.0-12.9 months

N=4...children whose developmental ages are 13.0-13.9 months

4 IDs	7 goals
5060	...1
5076	...2
5113	...3
5120	...1

Functional use of objects/Plays (4 IDs)

5066	To manipulate objects appropriately
5076	Scribble with a crayon
5113	Simple puzzles Play with form boards, blocks Scribbling & imitating crayon strokes
5120	Simple play with toys, e.g. simple form fitters, stacking blocks, etc.

To develop concept of object permanence (1 ID)

5076	Demonstrate the concept of object permanence

N=9...children whose developmental ages are 14.0-14.9 months

9 IDs	15 goals
5004	...2
5011	...2
5052	...2
5058	...2
5075	...2
5104	...1
5122	...1
5173	...2
5218	...1

Functional use of objects/Plays (6 IDs)

5004	Color within the lines
5052	To develop refined midline activities
5075	To manipulate toys in & out of a container
5104	Play with stacking toys, graduated cylinders, puzzles
5122	Functional use of toys & objects, crayons to color, blocks to stack, containers to fill, etc.
5173	To carry things in a bag or type of container during play

Imitative actions (4 IDs)

5004	Imitate actions of adults in play
5011	Imitates scribbling Imitates actions of adults
5052	To imitate actions of adults
5173	To imitate familiar actions of his mother & routines such as pat-a-cake

Ability to attend to & complete short-term tasks (2 IDs)

5058	Lengthen attention span involving perceptual-motor tasks
5218	Ability to attend to & complete short-term tasks

To develop concept of object permanence (1 ID)

5075	To deal with the concept of object permanence

Ceiling on KID Scale (1 ID)

5058	Ceiling on KIDS

N=2...children whose developmental ages are 15.0-15.9 months

2 IDs	4 goals
5054	...2
5071	...2

To develop concept of object permanence (1 ID)

5071 Demonstrate the concept of object permanence

Imitative actions (1 ID)

5054 Imitate simple actions of adult

Concentration/Active thought processes (1 ID)

5071 Respond appropriately to up & down

Ceiling on KID Scale (1 ID)

5054 Ceiling on KIDS

Motor long-term goals

N=29...children whose developmental ages are 1.0-1.9 months

29 IDs	57 goals
5012...	2
5020...	1
5021...	3
5066...	2
5068...	2
5069...	2
5070...	3
5072...	2
5110...	2
5115...	3
5116...	3
5151...	3
5155...	3
5156...	2
5174...	1
5175...	3
5176...	3
5200...	1
5207...	2
5211...	2
5216...	1
5217...	1
5221...	1
5223...	1
5224...	1
5225...	3
5226...	2
5227...	1
5228...	1

To develop & increase head control (17 IDs)

5012	Increased head control
5020	Increase head control (& grasp)
5021	Increase head control
5068	Provide positioning for head control
5069	To develop head control
5072	To facilitate acquisition of head control
5110	Head balanced & turnds freely
5116	Greater head control
5151	Develop head control
5155	Head control
5207	Supported head control
5216	Head control
5217	Minimal head control
5223	Head control
5225	Head control
5226	Head control
5227	Head control

Hand coordination/Object manipulation (11 IDs)

5012	Increase grasp - self-initiated
5021	Dev'l grasp
5110	Using one hand to hold a toy, the other to play with
5115	Grasping objects
5116	Holds a toy
5151	Reach for & obtain objects (that or touching body or that he can hear)
5155	Holds an object placed in hand
5156	Hold small light-weight object in hand
5176	To hold a toy & shake a rattle
5207	Limited grasping
5211	Grasping & holding object

To be able to sit (10 IDs)

5021	Sit with support
5070	To sit with support
5115	Sit alone
5116	Sits with slight support
5151	Sit with support
5156	Sit with minimal head support
5200	Be able to sit erect with eyes forward & arms free
5221	Sit at table surface, eyes forward, arms free
5225	Be able to sit erect at a table surface, eyes forward, arms free
5226	Sitting upright at table in wheelchair

Maintain range of motion in extremities (7 IDs)

5066 Maintain range of motion in extremities
5068 Maintain range of motion in extremities
5069 To maintain range of motion in extremities
5072 Maintain current range of motion in extremities
5224 Spontaneous arm & leg movements
5225 Spontaneous arm & leg movements
5228 Make spontaneous movements of limbs

To increase postural control (4 IDs)

5066 Provide proper positioning to maintain body alignment
5174 To increase her postural control (e.g. sit w/ some support, hold her head steady while being pulled in a sitting position, place her feet on floor while being held in a standing position)
To hold his head steady while being pulled up to a
5175 sitting position
To place his feet on the floor if held standing
5176 To stand if held under her arms

Developing means of locomotion (4 IDs)

5070 To roll from side to back
5115 Get about by rolling
5176 To roll from stomach to back
5211 Roll around to explore

To elevate self from prone position (3 IDs)

5070 To elevate self by arms from prone position
5155 Lifts head while lying on stomach
5175 To push his chest of th esurface on which his chest is lying

N=13...children whose developmental ages are 2.0-2.9 months

13 IDs 30 goals
5001...1
5019...2
5061...2
5065...2
5103...3
5105...3
5112...3
5164...3
5167...3
5202...1
5206...1
5210...2
5222...3

Hand coordination/Object manipulation (8 IDs)

5001 Reaches for toy
5103 Controlled opening & closing of hand
5105 Manipulates objects with fingers
5112 Reaching & grasping toys
5164 Object manipulation - hold & shake toy in hand
5167 Close hand when toy placed in palm
5210 Handle & manipulate varieties of small objects
5222 Handle & manipulate small objects

To develop & increase head control (7 IDs)

5019 Increase head control
5065 Provide positions to encourage head control
5103 Head control
5112 Good head control
5164 Increase flexibility of head control
5167 Increase head control
5222 Increase head control

To be able to sit (7 IDs)

5001 Sits without support
5019 Increase sitting
5061 Sits independently while playing with objects
5105 Sits with minimal support
5112 Siiting alone for a few seconds
5202 Sits erect in supporting chair with hands free
5206 Sits erect with prosthetic support & hands free

Developing means of locomotion (5 IDs)

5061 To creep on hands & knees
5103 Rolling onto side
5105 Rolls over
5210 Move to allow exploration
5222 Crawling

To increase postural control (2 IDs)

5164 Improve postural control (when held up under arms, place feet on floor, & support weight)
5167 Place feet on floor when held upright

Maintain range of motion in extremities (1 ID)

5065 Maintain range of motion in extremities

N=9...children whose developmental ages are 3.0-3.9 months

9 IDs	20 goals
5023...	2
5062...	4
5067...	2
5111...	3
5159...	3
5165...	3
5168...	1
5213...	1
5220...	1

To develop & increase head control (5 IDs)

5023 Dev'l head control
5067 Provide positioning for head control
5159 Head control when pulled to a sitting position
5165 Can control head movements, so she can explore environment with eyes
5220 Head control

Hand coordination/Object manipulation (5 IDs)

5062 To reach
5111 Reaches & grasps toys
5159 Holds objects
5165 Can hold ring or cube in hand
5213 Have enough fine motor control to manipulate toys, self-feed, & command wheelchair mobility

To be able to sit (3 IDs)

5023 Sits without support on floor
5062 To encourage sitting with support
5165 Sits without support

Developing means of locomotion (3 IDs)

5062 To roll from prone to supine
5111 Rolls over
5159 When on stomach, begins to move legs in crawling effort

Maintain range of motion in extremities (2 IDs)

5062 To maintain current range of motion
5067 Maintain range of motion in extremities

To increase postural control (2 IDs)

5111 Places feet on floor if held in standing position
5168 Basic postural control including:
    1) Head control during postural change
    2) Pushing chest up when prone
    3) Rolling from stomach to back

N=8...children whose developmental ages are 4.0-4.9 months

8 IDs	18 goals
5005...	2
5056...	2
5106...	3
5114...	2
5117...	3
5161...	2
5203...	2
5205...	2

Developing means of locomotion (6 IDs)

5106 Crawling combat style
5114 Crawling
5117 Gets about by rolling
5161 To roll from stomach to back, touch feet with hands, bounce up & down if held under arms, move around while sitting to get a toy
5203 Move to allow exploration & get to places & people
5205 Move to allow for exploration

Hand coordination/Object manipulation (6 IDs)

5005 Grasps objects of various sizes
5106 Neat-pincer grasp
5114 Reaching & grasping nearby objects
5117 Reaching & grasping toys
5161 To increase complexity of object manip. & be more aggressive in obtaining objects brought near
5203 Handle & manipulate small objects

To develop & increase head control (3 IDs)

5056 Strengthen head control
5117 Head control
5205 Head control

To be able to sit (3 IDs)

5005 Sit without support
5056 Improve sitting balance
5106 Gets to sitting by self

N=11...children whose developmental ages are 5.0-5.9 months

11 IDs	28 goals
5013	...3
5014	...2
5015	...2
5055	...2
5101	...4
5107	...3
5121	...2
5157	...3
5160	...3
5172	...3
5212	...1

Hand coordination/Object manipulation (11 IDs)

5013	Increased grasping
5014	Transfers objects from hand to hand
5015	Refined grasping
5055	Develop midline skills
5101	Better eye-hand coordination in reaching
5107	Manipulates small toys with fingers
5121	Improved fine-motor control of reaching & grasping
5157	Use pincer grasp (thumb & forefinger) to pick up objects
5160	Become more independent in obtaining & manipulating objects Holds a toy in each hand
5172	Expand repertoire of object manipulations (e.g. shake & hold in different ways, pick up pear-sized objects
5212	Handle & manipulate varieties of small objects

To be able to sit (6 IDs)

5013	Increased sitting
5014	Sits with no supports
5055	Increase balance when sitting
5107	Pulls to sit
5121	Sits alone steadily
5157	Sits alone for several minutes w/o support

Learning to stand and/or walk (4 IDs)

5013	"Prewalking" movements Stands with no supports
5015	Increased weight bearing
5101	Pulling to stand Standing by furniture
5160	Stands with support

Developing means of locomotion (3 IDs)

5101	Crawling
5157	Crawling
5172	Make crawling movements Work to get a toy out of reach

To develop & increase head control (1 ID)

5107	Head control

N=6...children whose developmental ages are 6.0-6.9 months

6 11
IDs goals
5051...2
5074...2
5118...2
5171...2
5215...1
5219...2

To be able to sit (3 IDs)

5074	To sit independently & play with toys
5171	To sit securely for a long time (i.e. without support so she should be able to twist her torso around)
5219	Sit up with arms & hands free

Hand coordination/Object manipulation (3 IDs)

5051	Improve reach & grasp
5074	To refine pincer grasp
5118	Has neat pincer grasp

Developing means of locomotion (3 IDs)

5171	To develop a means of locomotion
5215	Efficient functional movement to reach people & explore objects
5219	Purposeful movement

Learning to stand and/or walk (2 IDs)

5051	Improve balance while standing
5118	Walks holding on

N=4...children whose developmental ages are 7.0-7.9 months

4 10
IDs goals
5075...2
5102...3
5153...3
5166...2

Hand coordination/Object manipulation (3 IDs)

5075	To refine pincer grasp
5153	Learn simple manip. & coordination of toys
5166	Increase repertoire of obj. manip. with hands

To be able to sit (3 IDs)

5075	To improve sitting balance
5102	Pulling to sit (and stand) by himself
5153	Be able to sit from lying position

Developing a means of locomotion (3 IDs)

5102	Crawling
5153	Begin crawling or moving across floor
5166	Work to get toy out of reach

Learning to stand and/or walk (1 ID)

5102	Weight-bearing on legs

N=6...children whose developmental ages are 8.0-8.9 months

6 IDs	15 goals
5059	2
5063	2
5158	3
5163	5
5214	1
5218	2

Hand coordination/Object manipualtion (4 IDs)

5059	To play purposefully with toys
5063	To manipulate objects purposefully
5158	Substitutes right arm for hand in "holding objects" Uses pincer grasp for picking up small objects
5218	Ability to manipulate objects of all sizes Strengthen arms & legs, particularly on left side

Developing means of locomotion (3 IDs)

5158	Crawls over obstacles
5163	Climbs over objects
5214	Move to explore, roll, pull self forward

Learning to stand and/or walk (3 IDs)

5059	To improve standing balance
5063	Walking independently
5163	Pull to stand (crib, etc.) Stand alone Walk holding furniture Walk with one hand held

N=7...children whose developmental ages are 9.0-9.9 months

7 IDs	16 goals
5007	3
5113	3
5119	2
5152	3
5154	3
5201	1
5204	1

Learning to stand and/or walk (6 IDs)

5007	Walk alone well
5113	Stands alone Walks alone
5119	Walks alone
5152	Stands alone Walks with assistance
5154	Get to standing position w/o adult help Stands alone Walks with help
5204	Walking without assistance, up stairs

Developing means of locomotion (3 IDs)

5007	Climbs over objects Climb up onto furniture to reach objects
5115	Crawling upstairs
5201	Have means to move, to explore, to get to places & people

Hand coordination/Object manipulation (2 IDs)

5119	Scribbles with crayon
5152	Plays with ball

N=10...children whose developmental ages are 10.0-10.9 months

10 17
IDs goals
5002...1
5058...2
5064...2
5109...2
5120...2
5122...2
5123...2
5162...2
5170...1
5208...1

Hand coordination/Object manipulation (8 IDs)

5002 Increase eye-hand coordination
5058 Improve pincer
5109 Increased fine motor dexterity
5120 Handle & manipulate a variety of small objects
5122 Fine perceptual coordination, e.g. pegboards
5123 Turn pages of book
5162 To combine more than one toy in play (pick up two toys in one hand)
5170 Use both hands simultaneously & coordinate two objects during play

Learning to stand and/or walk (7 IDs)

5058 Walk independently
5064 To stand independently
5109 Walks upstairs alone
5120 Walk alone
5122 Walk alone
5123 Walks independently
5208 Walks with or without support of braces, etc.

To increase postural control (2 IDs)

5064 To improve balance while sitting
5162 To gain balance & flexibility of combining play with different positions (squats, stoops to fetch toy, throws ball)

N=5...children whose developmental ages are 11.0-11.9 months

5 9
IDs goals
5006...2
5008...2
5053...2
5057...2
5108...1

Hand coordination/Object manipulation (4 IDs)

5006 {Dev'l pincer grasp
Increase eye-hand coordination
5008 {Increase fine motor skills
Increase eye-hand coordination
5053 Improve perceptual-motor skills
5057 Develop refined pincer grasp

To increase postural control (2 IDs)

5057 Improve balance when walking
5108 Coordinated hopping, jumping, skipping

Ceiling on KID Scale (1 ID)

5053 Ceiling on KIDS

N=4...children whose developmental ages are 12.0-12.9 months

4	6
IDs	goals
5003	...1
5052	...2
5060	...1
5073	...2

To increase postural control (2 IDs)

5052 To improve balance while standing, walking
5073 To improve balance

Hand coordination/Object manipulation (2 IDs)

5003 Increase eye-hand coordination
5073 To use fingers, pincer grasp to play

Learning to stand and/or walk (1 ID)

5060 To walk independently

Ceiling on KID Scale (1 ID)

5052 Ceiling on KIDS

N=5...children whose developmental ages are 13.0-13.9 months

5	9
IDs	goals
5004	...1
5011	...2
5071	...2
5124	...2
5173	...2

Hand coordination/Object manipulation (4 IDs)

5004 Inc. eye-hand coordination in fine & gross motor tasks
5011 {Inc. eye-hand coordination
Manip. small objects
5071 To refine neat pincer grasp
5124 Fine perceptual-motor coordination, e.g. puzzles

To increase postural control (2 IDs)

5071 To improve standing balance
5173 To maintain balance in a squatting position

Learning to stand and/or walk (1 ID)

5124 Walk upstairs alone

To climb (1 ID)

5173 To climb on chair or furniture to reach things

N=3...children whose developmental ages are 14.0-14.9 months

3	8
IDs	goals
5054	...3
5076	...2
5104	...3

To increase postural control (3 IDs)

5054 Improve balance
5076 To improve standing & walking balance
5104 {Hopping on one foot
Walks up stairs alone

Hand coordination/Object manipulation (3 IDs)

5054	Improve pincer
5076	To refine pincer grasp
5104	Increased finger control

Ceiling on KID Scale (1 ID)

5054	Ceiling on KIDS

N=0...children whose developmental ages are 15.0-15.9 months

Social long-term goals

N=14...children whose developmental ages are 1.0-1.9 months

14 IDs 22 goals
5020...2
5068...1
5101...1
5110...2
5112...3
5175...2
5200...1
5207...1
5217...1
5222...2
5225...3
5226...1
5227...1
5228...1

Respond & attend to people (9 IDs)

5020	Increase social resp.
5068	Provide tactile stimulation activities
5112	Laughs when tickled
5200	Attend to person's face, smile, touch, & voice & respond
5217	Respond to social communication
5225	Respond to social reinforcement Attend to person's face, smile, touch, & voice
5226	Attend to person's face, smile, touch, & voice & respond
5227	Attend to person's face, smile, talk & touch, respond
5228	Respond to voices, tactile stimulation

Dyadic exchanges (7 IDs)

5020	Engages in play
5101	Playing more simple games with adults, i.e. peek-a-boo, pat-a-cake
5110	Plays simple games, e.g. peek-a-boo Give & take with toys
5175	To try to get adult's attention by smiling or babbling To look at people & become quiet while doing so
5207	Dyadic exchanges or games
5222	Dyadic exchanges
5225	Dyadic exchanges (e.g. peek-a-boo)

Recognition of people (1 ID)

5112	Smiles at her mirror image Recognizes familiar adults

Imitates (1 ID)

5222	Imitate vocalizations

N=16...children whose developmental ages are 2.0-2.9 months

16 IDs 26 goals
5021...2
5065...1
5066...1
5070...2
5072...2
5116...3
5151...2
5159...2
5161...2
5167...2
5172...1
5211...1
5216...1
5219...1
5221...2
5224...1

Respond & attend to people (12 IDs)

5021	Show affect towards parents or teacher
5065	To maintain interest in adult contact
5066	Increase interest in contacts with adults
5116	Tries to get adult attention by smiling/babbling
5151	Respond positively as feedback for adults (by babbling, smiling)
5159	Demonstrates enjoyment of adult attempts at stimulation
5161	To use more mature means of gaining adult attention such as smiling & babbling
5167	Smile & babble to get adults' attention
5172	Take a more attentive role with other people (e.g. quietly observe other people, try to get their attention by crying, smiling, or babbling, & babble when spoken to)
5211	Attend & respond to other people by smiling & touching
5216	Attend to persons
5221	Attend to person's face, smile, touch, voice, & respond

Dyadic exchanges (6 IDs)

5021 Engage in "games" with adults
5070 To engage in physical play with adult
5116 Enjoys peek-a-boo
5167 Enagage in physical play
5219 Pleasurable interaction with adults & other children
5221 Two-person games

Recognition of people (2 IDs)

5151 Recognize familiar adults by their voice
5161 To recognize familiar face, e.g. react differently to strangers & familiar adults, smile to a funny face

Increase frequency of vocal play (1 ID)

5072 Encourage vocal response to adult attention
5072 To increase frequency of vocal play

Follows simple commands (1 ID)

5070 To stop activity when told "no"

Interested in mirror images (1 ID)

5116 Reaches for mirror images

Plays with objects (1 ID)

5159 Plays with toys

N=4...children whose developmental ages are 3.0-3.9 months

4 IDs	5 goals
5061	1
5067	1
5164	1
5210	2

Respond & attend to people (3 IDs)

5067 Attend to people
5164 Become more interested in adults (e.g. reaching for & touching familiar adults, showing interest in objects they offer, smiling at funny faces they make)
5210 Attend & respond to people

Dyadic exchanges (2 IDs)

5061 To engage in social games with adult
5210 Dyadic games & exchanges

N=20...children whose developmental ages are 4.0-4.9 months

20 IDs 32 goals

5001...2
5012...1
5051...1
5055...1
5056...1
5062...1
5069...1
5106...2
5114...2
5155...3
5156...2
5158...3
5162...2
5174...1
5176...2
5202...1
5203...1
5205...1
5212...1
5220...2

Dyadic exchanges (8 IDs)

5051 Encourage social interaction with adults
5056 Enjoy adult contact
5069 To provide daily experiences with adult attention
5155 Attends to (quiets, turns head toward adult talking)
5156 Demonstrates preference for social interaction by smiling, turning head towards others)
5174 To become more interested in observing adults & more responsive to their attention (e.g. seeking adult attention by making sounds & smiling, smiling at funny face, getting excited when picked up)
5202 Dyadic exchanges with adults
5205 Respond to social reinforcement

Dyadic play/Playing games (7 IDs)

5001 React to games with adults
5012 Imitate simple games
5055 Play simple games w/ adult
5062 To participate in social game with adult
5106 Playing games
5212 Dyadic exchanges & simple games
5220 Dyadic exchangse & simple games

Recognition of people (6 IDs)

5114 Reaches for familiar person
5156 Recognize familiar adults by non-visual means
5162 React differently to familiar vs. unfamiliar adults
5176 {To hand a toy to an outreached hand of a familiar adult
{To reach for & touch familiar adults
5203 Respond to & recognize people with preverbal communication
5220 Respond to familiar adults

Increase frequency of vocal play (3 IDs)

5155 Babbles or makes sounds when talked to
5158 Makes a variety of consonant, vowel sounds, e.g. baba, mama. lala
5162 Use vocalization socially (e.g. to try to get an adult's attention or to participate in "conversation" with an adult

Knows his/her name (2 IDs)

5155 Turns head to name
5158 Knows & reacts to mane

Imitates (2 IDs)

5158 Imitates sounds
5205 Vocal imitation

Interested in mirror images (2 IDs)

5001 Smile at mirror image
5114 Reaches & pats his mirror image

Understands concept of ownership (1 ID)

5106 Knows what's hers, shows possessiveness

N=6...children whose developmental ages are 5.0-5.9 months

6 IDs	11 goals
5013	...2
5023	...2
5074	...2
5105	...2
5111	...2
5115	...1

Follows simple commands (4 IDs)

5013 Respond to demands
5023 Respond to simple requests
5074 To give a toy to adult when asked
5105 Give & take simple toys

Dyadic play/Playing games (3 IDs)

5023 Imitate simple games
5105 Plays simple games (pat-a-cake, peek-a-boo)
5115 Play some simple games; i.e. peek-a-boo, knocking ball back & forth

Respond & attend to people (2 IDs)

5013 Increase approp. affect
5111 {Smile if adult makes funny face
{Laughs aloud when tickled

To develop self-awareness (1 ID)

5074 To develop self-awareness

N=7...children whose developmental ages are 6.0-6.9 months

7 IDs	14 goals
5008	...2
5015	...2
5019	...2
5153	...2
5154	...2
5160	...3
5223	...1

Respond & attend to people (5 IDs)

5015 Shows affection to parents
5019 Increase social resp.
5153 {Seek out & obtain attention from adults purposefully
{Be more responsive by smiling more
5154 Seek out attention from adults
5223 Attend & respond to person's face, smile, touch, voice

Imitates (3 IDs)

5008 {Imitates actions of adults
{Copy simple actions
5019 Increase imitative play
5160 Imitates familiar actions

Follows simple commands (1 ID)

5015 Follows simple commands consistently

Dyadic play/Playing games (1 ID)

5154 Peek-a-boo, or other social turn-taking games

Plays with objects (1 ID)

5160 Enjoys playing with objects

Learning to talk (1 ID)

5160 Engages in social-language routines

N=13...children whose developmental ages are 7.0-7.9 months

13 IDs	24 goals
5005...	2
5007...	2
5059...	2
5063...	1
5103...	3
5107...	3
5108...	2
5118...	2
5152...	2
5165...	2
5206...	1
5213...	1
5215...	1

Imitates (8 IDs)

5007	Imitates the actions of adults & other children
5059	To imitate simple actions
5063	To imitate simple movements
5103	Mimic facial expressions
5107	Mimic facial expressions
5108	Imitates another child
5213	Use gestural or vocal imitation
5215	Gestural or vocal imitation

Dyadic play/Playing games (4 IDs)

5059	To play games with adult
5103	Plays simple games of give & take
5107	Playing simple games
5118	Plays simple games with another, i.e. peek-a-boo, pat-a-cake

Waves bye-bye (4 IDs)

5103	Wave bye-bye
5107	Wave bye-bye
5108	Waves bye-bye at right time without being asked
5118	Waves bye-bye at right time

Plays with objects (2 IDs)

5005	Plays w/ toys for several minutes alone
5165	Plays independently

Gives feedback (2 IDs)

5152	Responds by smiling to express enjoyment of social interaction
5165	Gives increased feedback to adults about enjoyment of contact

Follows simple commands (2 IDs)

5007	Follow simple commands
5206	Respond to simple commands & inhibitions

Initiates social interaction (1 ID)

5152	Initiates social interaction

N=13...children whose developmental ages are 8.0-8.9 months

13 IDs	26 goals
5006	...2
5014	...2
5057	...1
5073	...1
5102	...1
5109	...3
5113	...2
5157	...3
5166	...2
5201	...1
5204	...4
5208	...2
5214	...2

Dyadic play/Playing games (7 IDs)

5057 Encourage play with another child
5102 Playing games with others
5109 Plays with another
5113 Plays with another child
5157 To acquire concept of play with others
Play games with adults (peek-a-boo, dropping toys) that involve taking turns & mutual participants
5204 Dyadic exchanges
5214 Repertoire of dyadic games

Imitates (4 IDs)

5109 Imitating other children
5204 Imitation
5208 Imitates
5214 Reliable imitation of gestures & sounds

Follows simple commands (3 IDs)

5006 Inc. resp. to requests following directions
5166 More expanded social repertoire, e.g. engage in social routines & be more sensitive to simple requests (come here, no) accompanied by motions
5208 Respond to simple requests & commands

Respond & attend to people (3 IDs)

5014 Increased affect
Shows affection to parents
5201 Respond to social reinforcement
5204 Respond to social reinforcement
Attend to people & respond

Increased self-awareness (2 IDs)

5006 Recog. of body parts
5073 To recognize body parts

Plays with objects (2 IDs)

5157 Plays alone with toys for 5 minutes
5166 Play alone for brief periods

Cooperative (1 ID)

5109 Will cooperate

Waves bye-bye (1 ID)

5113 Waves bye-bye at right time

N=5...children whose developmental ages are 9.0-9.9 months

5 IDs	9 goals
5053	...1
5060	...2
5123	...2
5163	...2
5173	...2

Imitates (3 IDs)

5123 Copies simple actions
5163 Copying more simple actions & slightly more complex actions
5173 To imitate simple actions & facial expressions of others

Dyadic play/Playing games (2 IDs)

5053 Play appropriately with adults & children
5060 To play simple games with child
To play simple games w/ adult
5163 To engage in more social routines like "peek-a-boo", clapping hands when asked & babbling when spoken to

Plays with objects (1 ID)

5163 Playing alone for about 15 minutes with interesting, familiar toys

Understands concept of ownership (1 ID)

5123 Simple give & take with toys with another

N=9...children whose developmental ages are 10.0-10.9 months

9 IDs	16 goals
5003	...1
5076	...2
5117	...1
5119	...2
5121	...1
5122	...2
5124	...2
5168	...3
5170	...2

Dyadic play/Playing games (8 IDs)

5076 To interact with an adult in simple games
5117 Play simple games of give & take with toys, i.e. rolling a ball back & forth
5119 Plays simple games with adults
5121 Play simple games of give & take
5122 Plays simple games, e.g. rolling ball back & forth
5124 Plays simple games with adults & children
5168 Pat-a-cake
5170 Engage in social routines

Imitates (3 IDs)

5003 Imitate adult's actions & those of other children
5119 Gestural imitation of many things
5170 Increase range of imitative behaviors

Understands concept of ownership (2 IDs)

5122 Understands ownership
5124 Understands concept of ownership

Follows simple commands (1 ID)

5076 To follow simple directions

Has attention getting devices (1 ID)

5168 Drops toys for adults to reach
Use postural changes to seek adult's attention (stretch arms, reach, & touch)

N=7...children whose developmental ages are 11.0-11.9 months

7 IDs	14 goals
5002	...2
5011	...2
5052	...2
5064	...1
5071	...2
5104	...3
5120	...2

Imitates (4 IDs)

5002	Imitates actions of adults & other children
5011	Imitates actions of adults
5104	Imitates another child
5120	Learning by vocal & gestural imitation

Dyadic play/Playing games (4 IDs)

5052	Encourage play with other children
5064	To paly with adult
5104	Play simple games with another
5120	Simple games with another child

Understands concept of ownership (2 IDs)

5011	Share toys
5071	To give a toy to an adult on request

Follows simple commands (1 ID)

5104	Follows more complex directions

Waves bye-bye (1 ID)

5071	Wave bye-bye at the appropriate time

Is affectionate (1 ID)

5002	Show affection to toys & other adults other than parents

Ceiling on KID Scale (1 ID)

5052	Ceiling on KIDS

N=2...children whose developmental ages are 12.0-12.9 months

2 IDs	5 goals
5171	...2
5218	...3

Imitates (1 ID)

5171	Mimic facial expression of familiar adults Imitate actions which require a greater degree of independent postural control

Understands concept of ownership (1 ID)

5218	Understand possession

Dyadic play/Playing games (1 ID)

5218	Engage in dyadic game exchanges

Responds to social reinforcement (1 ID)

5218	Respond to social reinforcement

N=4...children whose developmental ages are 13.0-13.9 months

4 7
IDs goals
5004...2
5054...1
5058...2
5075...2

Dyadic play/Playing games (3 IDs)
5054 To play simple games with a child
5058 Play simple games w/ child
5075 To play interactive games with adult

Follows simple commands (2 IDs)
5004 Increase responding to requests; following directions
5075 To stop an activity in response to "no"

To show negative affect (1 ID)
5004 Show negative affect

Ceiling on KID Scale (1 ID)
5058 Ceiling on KIDS

N=0...children whose developmental ages are 14.0-14.9 months

N=0...children whose developmental ages are 15.0-15.9 months

Language long-term goals

N=19...children whose developmental ages are 1.0-1.9 months

19 IDs	32 goals
5020	...2
5021	...2
5061	...1
5066	...1
5067	...2
5072	...1
5101	...1
5110	...4
5112	...2
5162	...3
5200	...1
5207	...1
5211	...1
5217	...1
5224	...2
5225	...2
5226	...1
5227	...2
5228	...2

Increase frequency of vocal play (10 IDs)

5020	Increase vocalizations Increase receptive lang.
5021	Inc. vocalizations Inc. receptive lang.
5061	To increase frequency of vocalizations
5066	Increase vocalizations
5067	Increase frequnecy of vocalizations
5162	Makes sounds when talked to
5207	Frequent & responsive vocalizations
5211	Frequent & responsive vocalizations
5225	Frequent & responsive vocalizations
5226	Frequent & responsive vocalizations

Communicate pain & pleasure (6 IDs)

5200	Communicate pain & pleasure vocally
5217	Communicate pleasure & pain
5224	Communicate pain & pleasure
5225	Communicate pain & pleasure
5227	Communicate pleasure & pain
5228	Communicate pleasure & pain

Recognizes words & names (6 IDs)

5101	Responding to name, no, bye-bye, & other single word cues
5110	Recognizes names of familiar objects
5112	Turns when she hears her name
5162	Learn to recognize sound of own name
5224	Receptive to name
5228	Receptive to name

Vocal imitation (3 IDs)

5110	Tries to repeat words
5112	Imitate non-speech sounds (cough, click, grunt) & simple speech sounds
5162	Imitating some sounds

Localize sounds (2 IDs)

5067	Localize sounds
5072	To localize sounds

Communicates needs & wants (1 ID)

5110	Points to object he wants

N=4...children whose developmental ages are 2.0-2.9 months

4 8
IDs goals
5069...2
5161...2
5219...2
5222...2

Increase frequency of vocal play (3 IDs)
5069 To increase frequency of vocal play
5219 Rudimentary receptive language
5222 Frequent, responsive, stimulative vocalizations, call vowels, most consonants

Recognize words & names (1 ID)
5161 To pause after hearing own name, indicating recognition that communication interaction will occur

Vocal imitation (1 ID)
5161 To imitate sounds; at first non-speech sounds such as clicking, grunts; later speech sounds

Localize sounds (1 ID)
5069 To localize sound

Follows simple commands (1 ID)
5222 Compliance to simple commands

Communicates needs & wants (1 ID)
5219 Simple communication of wants & needs

N=16...children whose developmental ages are 3.0-3.9 months

16 36
IDs goals
5012...2
5055...3
5068...2
5070...2
5073...3
5116...2
5154...3
5155...3
5174...3
5175...2
5176...3
5202...2
5210...2
5212...2
5220...1
5221...1

Increase frequency of vocal play (14 IDs)
5055 Increase frequency of vocalizations
5068 Increase frequency of vocalizations
5070 Stimulate babbling
5116 Talks in his own language
5154 Expand use of sounds
5155 {Babbles in response to adult talking
Makes at least 3 sounds consistently
5174 {To make sounds while being smiled at or tickled
To expand her repertoire of speech sounds & practice by babbling alone
5175 {To produce a wider variety of speech sounds
To engage in more voice play (e.g. to babble when alone, to imitate non-speech sounds like clicks, grunts, & coughs
5176 {To spend time babbling to herself
Learn to modulate the volume of her voice
5202 Vocalize many sounds
5210 Frequent & responsive vocalizations
5212 Frequent & responsive vocalizations
5220 Frequent & responsive vocalizations
5221 Frequent responsive, & varied vocalizations

Recognizes words & names (6 IDs)

5055	React to specific words
5070	To respond to his name
5154	Recognize name
5155	Turns head to sound of her name or any familiar phrase
5210	Receptive to name
5212	Receptive to his name

Vocal imitation (5 IDs)

5012	Imitate simple words
5116	Imitate sounds, like clicks, coughs, grunts
5154	Imitate sounds
5174	To imitate non-speech vocalizations such as coughs,grunts, clicks,
5176	To make sounds like "ma-ma", "ba-ba", "la-la" alone & in rudimentary imitation games

Follows simple commands (3 IDs)

5012	Resp. to demands approp.
5073	To follow simple directions given w/ gestures
5202	Respond to simple commands like come here

Localize sounds (2 IDs)

5055	Localize sounds
5068	Localize sounds

Obtain hearing evaluation (1 ID)

5073	To secure audiological evaluation

Communicates nonverbally (1 ID)

5073	To use gestures

N=10...children whose developmental ages are 4.0-4.9 months

10 IDs	18 goals
5001	2
5007	2
5056	3
5062	1
5065	1
5151	3
5158	2
5167	2
5203	2
5216	1

Increase frequency of vocal play (9 IDs)

5001	Increase receptive language
	Increase expressive language
5007	Increase receptive language
	Increase expressive language
5056	Increase frequency of vocalization
5062	To increase frequency & variety of vocalization
5065	Increase frequency of vocalizations
5151	Broaden range of sounds
5167	Increase range of frequency of speech sound production
5203	Frequent & varied vocalizations
5216	Frequent responsive vocalizations

Vocal imitation (2 IDs)

5151	Imitate adults' sounds
5167	Imitate simple non-speech & speech sounds (cough, ma-ma, da-da)

Recognizes words & names (2 IDs)

5056 Encourage reaction to familiar words
5203 Responsive to own name

Recognizes familiar people (1 ID)

5158 Recognizes by voice or sight, familiar adults

Gives feedback (1 ID)

5158 Gives feedback to adults about what he enjoys by laughing, smiling, "working" to get adult attention

Pairs sounds together (1 ID)

5151 Begin pairing different sounds together or repeating sounds, e.g. ba-ba

N= 7...children whose developmental ages are 5.0-5.9 months

7 IDs	16 goals
5008	2
5108	2
5114	2
5115	3
5156	2
5165	1
5172	4

Increase frequency of vocal play (4 IDs)

5008 {Make sounds w/ consonants
Inc. receptive language
5115 Babbling
5156 {Increase range of speech sounds
Increase in responsiveness to others' speech to her smiling, recognizing
5172 {Babble when alone to gain practice learning to talk
Increase # of different sounds made (mmm,sss, ma-ma, ba, la) & frequency of making them (i.e. repeat sounds over & over again)

Vocal imitation (3 IDs)

5114 Imitates ma-ma or da-da
5115 Vocal imitation
5172 Imitate non-speech vocalizations such as coughs, grunts, clicks

Use voice to show emotions (2 IDs)

5165 Use vocalizations more in social context & show range of emotions
5172 Use voice to show emotions other than crying

Has one or several clear words (1 ID)

5108 Has one clear word

Able to indicate yes & no (1 ID)

5115 Indicate yes & no by head shake

Recognizes words & names (1 ID)

5108 Recognizes names of familiar objects

Understands the meanings behind words (1 ID)

5114 Understands bye-bye

N=12...children whose developmental ages are 6.0-6.9 months

12 IDs	24 goals
5019...	2
5023...	2
5051...	2
5059...	2
5074...	2
5105...	2
5152...	3
5159...	3
5164...	2
5205...	2
5213...	1
5223...	1

Increase frequency of vocal play (7 IDs)

5019 Increase vocalizations of simple words
Consistently responds to several common words
5023 Inc. receptive language
5051 Increase frequency & variety of vocalizations
Expand receptive vocabulary - make choices
5074 To stimulate sound production & increase the frequency of vocal play
5159 Expresses enjoyment or stimulation by babbling or using other words
5164 Increase range of speech sounds made
5213 Frequent response vocalization using all vowels & consonants to understand communicative language

Follows simple commands (5 IDs)

5059 To respond to simple commands & use gestures
5074 To stop his activity in response to "no"
5105 Understands & responds to simple instructions
5152 Shows comprehension of common phrases like "come here" & "bye-bye"
5205 Compliance to simple commands & inhibitions

Vocal imitation (5 IDs)

5023 Imitates simple words
5059 To imitate sounds made by adult
5152 Imitates words
5159 Imitates broad range of sounds
5164 Imitate non-speech sounds & speech sounds she can already produce when they are produced by a familiar adult

Has one or several clear words (3 IDs)

5105 Says one clear word
5152 Speaks one clear word
5159 Uses one clear word

Communicates needs & wants (1 ID)

5205 Communicate simple needs

Communicates pain & pleasure (1 ID)

5223 Communicate pain & pleasure

N=14...children whose developmental ages are 7.0-7.9 months

14 IDs	30 goals
5013...	2
5057...	2
5063...	2
5102...	2
5106...	2
5109...	3
5111...	3
5118...	3
5123...	2
5153...	3
5160...	2
5163...	2
5206...	1
5214...	1

Vocal imitations (7 IDs)

5013	Tries to imitate sounds, noises
5057	Imitates sounds made by adult
5102	Imitating & using a few words
5109	Imitates a word
5123	Imitates ma-ma or da-da
5160	Imitates consonant-vowel speech sounds (baba,mama)
5163	Imitation of range of simple speech sounds

Follows simple commands (6 IDs)

5106	Understanding & responding to simple phrases
5111	Reacts to peek-a-boo Turns head to his name
5118	Follows directions
5153	Understands simple phrases like "give me"
5160	Respond to simple language common phrases (e.g. come here, bye-bye)
5206	Dyadic social exchanges

Recognizes words & names (5 IDs)

5013	Word recognition
5109	Recognizes names of familiar objects
5123	Recognizes names of familiar objects consistently
5153	Know name of objects, e.g. cup, juice
5163	Recognition of names of a few well known people & objects

Increase frequency of vocal play (4 IDs)

5057	Expand receptive vocabulary
5063	Increase variety of vocalizations
5111	Babbles to himself
5214	Frequent response vocalizations using range of consonants & vowel syllables

Has one or several clear words (3 IDs)

5102	Understanding one-word utterances
5118	Has several words
5153	Speak & understand one clear word

Communicates needs & wants (2 IDs)

5106	Able to verbally communicate her needs
5109	Indicates needs by pointing

Makes choices (1 ID)

5063	To encourage making choices

Communicates nonverbally (1 ID)

5118	Nonverbal communicating

N=11...children whose developmental ages are 8.0-8.9 months

11 IDs	23 goals
5006	2
5014	2
5015	2
5107	2
5113	3
5117	2
5121	1
5157	3
5173	2
5204	3
5208	1

Increase frequency of vocal play (5 IDs)

5006	Inc. expressive language
	Increase receptive language
5157	Says "mama", "lala", "baba"
5173	To increase range of speech sounds he makes (e.g. mmm,sss)
5204	Responsive vocalizations
5208	Develop repertoire of vowel & consonant sounds

Vocal imitation (5 IDs)

5014	Repeats simple words
5015	Tries to imitate simple words
5157	Imitate sounds made by adults
5173	To imitate speech sounds (ma-ma, ba-ba) and non-speech sounds (coughs, grunts, clicks)
5204	Imitate words & sounds

Has one or several clear words (4 IDs)

5107	One clear word
5113	Several clear words
	Repeats words when asked
5117	Has one or two clear words
5157	Use one clear word meaningfully

Recognizes words & names (3 IDs)

5014	Recog. familiar word-object pairs
5015	Word recognition
5107	Recognizes names of familiar objects

Communicates nonverbally (2 IDs)

5117	Communicates nonverbally by shaking head yes & no, etc.
5121	Communicate needs & desires with communication board.

Follows simple commands (2 IDs)

5113	Follows simple directions consistently
5204	Compliance to some simple commands & inhibitions

N=11...children whose developmental ages are 9.0-9.9 months

11 IDs	23 goals
5002	2
5005	2
5011	2
5053	2
5064	2
5076	2
5103	3
5104	2
5168	3
5170	2
5215	1

Increase frequency of vocal play (6 IDs)

5002	Increase receptive language
	Increase expressive language
5005	Increase receptive language
	Increase expressive language
5011	Increase sound production
5168	Increased range of speech sound production (ma, la)
5170	Increase range of uses of language
	Increase expressive & receptive vocabulary
5215	Simple communicative speech

Vocal imitation (4 IDs)

5053	Imitate sounds made by adult
5064	To imitate sounds
5076	To imitate sounds made by an adult
5168	Increased range of imitation (click, cough, speech sounds)

Follow simple commands (4 IDs)

5053	Demonstrate understanding of simple commands
5103	Understand simple one step commands
5104	Understands & performs two-step commands
5168	Respond to simple directions (come here, up)

Has one or several clear words (2 IDs)

5103	Have one clear word
5104	Several clear words

Communicates needs & wants (2 IDs)

5011	Make requests known
5103	Indicate her needs verbally or nonverbally

Understands the meanings behind words (2 IDs)

5064	To give physical reaction to specific words
5076	To wave bye-bye at an appropriate time

N=9...children whose developmental ages are 10.0-10.9 months

9 IDs	16 goals
5003	...2
5052	...2
5060	...2
5120	...1
5122	...1
5124	...2
5171	...2
5201	...2
5218	...2

Communicates needs & wants (4 IDs)

5120	Communicates simple needs verbally (e.g. yes, no, give me, etc.)
5122	Communicates needs & desires verbally & nonverbally
5171	Indicate desired objects by pointing & naming
5201	Communicate needs verbally

Follows simple commands (4 IDs)

5052	Encourage following of 1 & 2 part directions
5060	Respond to simple commands & choices
5201	Compliance with simple demands
5218	Receptive to commands & inhibitions

Increase frequency of vocal play (3 IDs)

5003	Increase receptive language Increase expressive language
5171	Use words with meaning (i.e. to communicate)
5218	Vocalizations using all vowels & most consonants

Vocal imitation (2 IDs)

5060	Imitate sounds
5124	Tries to repeat words

Recognizes words & names (1 ID)

5124	Recognizes names of familiar objects

Increase use of labels (1 ID)

5052	Expand vocabulary of labels

N=4...children whose developmental ages are 11.0-11.9 months

4 IDs	10 goals
5054...	3
5071...	2
5119...	2
5166...	3

Follows simple commands (3 IDs)

5054	Follow 1 & 2 part directions
5119	Compliance to simple commands & inhibitions
5166	Follow simple commands

Recognizes objects (2 IDs)

5071	To identify familiar objects when named
5166	Point to desired object Point to named object

Vocal imitation (2 IDs)

5054	Vocal imitation
5119	Imitating words

Increase frequency of vocal play (1 ID)

5071	To increase frequency of sound production

Communicates nonverbally (1 ID)

5054	Use gestures to make choices

N=2...children whose developmental ages are 12.0-12.9 months

2 IDs	6 goals
5004...	2
5058...	4

Increase use of labels (1 ID)

5058	Pair labels with gestures Increase use of labels

Increase frequency of vocal play (1 ID)

5004	Increase receptive language Increase expressive language

Follows simple commands (1 ID)

5058	Follow 1 & 2 part directions

Ceiling on KID Scale (1 ID)

5058	Almost ceiling on KIDS

N=0...children whose developmental ages are 13.0-13.9 months

N=1...child whose developmental age is 14.0-14.9 months

1 IDs	2 goals	
5075...	2	Vocal imitation (1 ID) 5075 To imitate sounds & familiar words Recognizes objects (1 ID) 5075 To identify familiar objects

N=0...children whose developmental ages are 15.0-15.9 months

Self-help long-term goals

N=14...children whose developmental ages are 1.0-1.9 months

14 IDs	22 goals
5061...	2
5072...	3
5155...	3
5164...	1
5174...	3
5175...	2
5200...	1
5212...	1
5217...	1
5224...	1
5225...	1
5226...	1
5227...	1
5228...	1

To approach & enjoy eating (9 IDs)

5061 To increase varieties of foods & textures
5155 Eats textured food
5164 Begin to anticipate different components of the feeding situation & to play a more active role (e.g. open mouth for bottle or cup, suck soft food off spoon)
5200 Approach & enjoy eating
5224 Assisting with own feeding
5225 Eat mashed table foods
5226 Approach & enjoy eating
5227 Approach & enjoy eating
5228 Eat soft food

To progress towards feeding by mouth (5 IDs)

5072 To close lips over spoon
To inhibit gag
5155 Swallows w/o choking
Opens mouth in preparation for spoon before spoon touches mouth
5174 To swallow soft foods without difficulty & keep them in her mouth
5175 During meals, will keep food in mouth & swallow more textured foods
5217 Feed by mouth

Drinks from a cup (3 IDs)

5061 To drink from cup when held by adult
5072 To drink from cup w/o spilling
5174 To assist in bottle use by placing hands around bottle

To participate in dressing & undressing (3 IDs)

5174 To assist in dressing by lifting legs during diapering
5175 To lift his legs while his diaper is being changed
5212 Participate in dressing

N=4...children whose developmental ages are 2.0-2.9 months

4 IDs	8 goals
5112...	2
5176...	3
5207...	1
5221...	2

To approach & enjoy eating (4 IDs)

5112 Placing bits of food in her mouth
5176 To eat solid foods more competently (e.g. keep food in her mouth & not gag or choke)
5207 Approach & enjoy eating
5221 Approach & enjoy eating

Learns to use cup & utensils (2 IDs)

5176 To assist in feeding by helping hold utensils
5221 Drinks from cup held by adult without spilling

To participate in dressing & undressing (2 IDs)

5176 To assist in dressing by lifting legs for diapers, etc.
5221 Participate in dressing

N=4...children whose developmental ages are 3.0-3.9 months

4 IDs	8 goals
5114	3
5153	3
5167	1
5223	1

To progress towards feeding by mouth (3 IDs)

5114 Finger feeds
5153 Eat soft food
5167 Begin participating in feeding by helping hold utensils & pick up food

Drinks from a cup (2 IDs)

5114 Holds onto bottle picking it up when dropped
5153 Drinks liquids easily

To participate in dressing & undressing (2 IDs)

5114 Pulls off socks
5153 Assists in dressing & bath

- - - - - (1 ID)

5223 - - - - -

N=25...children whose developmental ages are 4.0-4.9 months

25 IDs	46 goals
5001	2
5019	2
5020	2
5021	2
5056	2
5066	2
5067	1
5068	2
5069	1
5070	4
5101	2
5103	2
5110	2
5116	3
5151	1
5156	3
5159	3
5165	2
5202	1
5206	1
5210	1
5211	1
5213	2
5220	2
5222	1

To approach & enjoy eating (16 IDs)

5001 Eat table food
5019 Eats table food w/ little or no ass't.
5020 Eats table food with little or no assistance
5021 Eats table food with little or no assistance
5056 Accepts a variety of food w/o resistance
5101 Eating a diet of finger foods by self
5103 Eat regular diet
5156 Eats more textured food
5159 Increase range of food he can eat
5165 Eats wider range of table foods with less mess or choking
5202 Increased participation in eating
5206 Eat soft foods & finger foods
5210 Finger food & assist in feeding
5211 Begin to participate in eating
5220 Participation in feeding
5222 Eats table foods

Drinks from a cup (8 IDs)

5001	Drink from a cup without ass't
5019	Drinks from a cup
5020	Drinks from a cup w/out assistance
5021	Drinks from a cup w/out assistance
5068	Drinks from a cup
5101	Drinks from a cup by self
5110	Drinks without choking or spilling while adult holds cup
5116	Drinks from cup held by adult without spilling

To progress towards feeding by mouth (7 IDs)

5006	Inhibit gag Keep food in mouth
5067	Inhibit gag
5068	Keep food in mouth
5069	To chew table foods
5070	Chew food
5110	Chews & eats table food
5156	Controls tongue & mouth to receive & swallow food Swallows all food put in mouth

Learns to use cup & utensils (5 IDs)

5056	Hold cup or spoon
5070	Put hands around bottle during feeding Hold a spoon
5116	Holds own bottle
5159	Holds spoon & brings to mouth, with help from adult
5165	Holds onto adult's hand, holding spoon, cup

To participate in dressing & undressing (5 IDs)

5070	To cooperate & participate during dressing
5103	Assist in dressing & undressing
5159	Helps in dressing
5213	Dress self in part
5220	Participation in dressing

Self-feeds (4 IDs)

5116	Places bits of food in his mouth
5151	Feed finger foods to self
5213	Self-feeding
5222	Self-feeding

N=3...children whose developmental ages are 5.0-5.9 months

3 4
IDs goals
5013...1
5065...1
5074...2

To progress towards feeding by mouth (2 IDs)

5013	Eat table foods w/ little assisatance
5065	Stimulate chewing

Learns to use cup & utensils (1 ID)

5074	To pick up a cup with two hands & drink from it

To participate in dressing & undressing (1 ID)

5074	To cooperate & participate in dressing

N=19...children whose developmental ages are 6.0-6.9 months

19 IDs	43 goals
5005	...2
5012	...2
5015	...2
5023	...2
5055	...3
5062	...1
5102	...3
5105	...2
5107	...3
5111	...3
5115	...1
5117	...2
5118	...3
5121	...1
5157	...4
5168	...2
5172	...2
5203	...2
5205	...3

Self-feeds (15 IDs)

5005	Self feeds
5012	Self feed with spoon
5015	Self feeds
5023	Self feeds
5102	Eating diet of finger foods by self
5105	Finger feeds bits of food
5107	Eats table food by self with fingers
5111	Finger feeds
5115	Feeds himself by bending over plate & cup & using his mouth
5117	Some self feeding with hands using cup
5118	Finger feeds
5157	Uses hands to put food in her mouth
5168	Assist in eating finger foods
5203	Self feeding
5205	Self feed finger foods

To participate in dressing & undressing (9 IDs)

5015	Pulls off socks
5055	Begin dressing skills
5107	Helps in dressing
5117	Assisting in dressing by pushing arms through, etc.
5118	Assists in dressing & undressing
5157	Helps in dressing
5168	Assist in dressing (lift legs, push arms thru clothes at appropriate times)
5203	Participation in dressing & undressing
5205	Helps dress

Drinks from a cup (8 IDs)

5005	Drinks from cup alone
5012	Drinking from cup alone
5023	Drinks from a cup alone
5102	Drinking from cup by self
5105	Drinks from cup by self
5107	Drinks from cup by self
5168	Assist in drinking
5205	Drink from cup

Learns to use cup & utensils (6 IDs)

5055	Hold cup
5102	Using spoon by self
5111	Picks up cup using hands Picks up spoon by handle
5118	Uses cup
5157	Uses spoon
5172	Begin assisting with utensils

To progress towards feeding by mouth (2 IDs)

5055	Chew table foods
5062	Facilitate swallowing

To approach & enjoy eating (2 IDs)

5157 Eats wide range of table foods
5172 To increase competence & independence in eating (e.g. keep food in mouth, hol, bite, & chew harder foods such as pretzels & place bits of food in her own mouth

To be toilet-trained (1 ID)

5121 Indicates a need to go to the toilet

N=6...children whose developmental ages are 7.0-7.9 months

6 IDs	16 goals
5014...	2
5106...	3
5160...	2
5170...	4
5171...	3
5219...	2

To participate in dressing & undressing (5 IDs)

5014 Assists in dressing
5106 Assisting in dressing
5160 Helps in dressing
5170 Place limbs into garments independently
5171 Play a more active role during dressing

Self-feeds (5 IDs)

5014 Self feeds
5160 Independence in eating
5170 Place bits of food into mouth
Prefer to self-feed
5171 Feed self soft finger foods
5219 Self feeding

Learns to use cup & utensils (3 IDs)

5106 Feeding self with spoon
5170 Uses spoon to feed self independently
5219 Use spoon & eat finger food

Drinks from a cup (2 IDs)

5106 Drinking from cup by self
5160 Independence in drinking

N=4...children whose developmental ages are 8.0-8.9 months

4 IDs	8 goals
5051...	3
5073...	3
5215...	1
5216...	1

Self-feeds (3 IDs)

5051 Eat independently
5073 To feed himself with spoon
5215 Self feeding

To participate in dressing & undressing (2 IDs)

5051 To remove clothing with help
5073 To take off clothing

To progress towards feeding by mouth (1 ID)

5073 To chew table foods

To help wash/cleanup one's self (1 ID)

5051 To wash face, use napkin with help

- - - - - - - - (1 ID)

5216 - - - - - - - -

N=3...children whose developmental ages are 9.0-9.9 months

3 10
IDs goals
5063...2
5161...3
5163...5

Self-feeds (3 IDs)

5063 To chew table foods
5161 Be able to & prefer to feed self, e.g. place bits of food in own mouth
5163 Feed self biscuit-type food
Feed self with spoon

To participate in dressing & undressing (2 IDs)

5161 Assist more in dressing by pushing leg into pant leg
5163 Aim arms/legs into sleeves/pants

To help wash/cleanup one's self (2 IDs)

5063 To wash face with help
5161 Assist in bathing with washcloth

Accepting of a variety of foods (1 ID)

5163 Eat table food
Enjoy new food

N=7...children whose developmental ages are 10.0-10.9 months

7 16
IDs goals
5007...2
5008...2
5059...1
5113...3
5124...2
5152...3
5158...3

To participate in dressing & undressing (6 IDs)

5007 Dress self
5008 Dress self
5059 To remove clothing w/ minimal assistance
5113 Can partially dress himself
5124 Independent in undressing, partially able to dress self
5158 Helps in dressing & undressing

Self-feeds (5 IDs)

5007 Eat alone without a mess
5008 Self feed
5124 Self-sufficient at table, i.e. pouring drink, etc.
5152 Self-feeding
5158 Eats neatly, self feeding

Accepting of a variety of foods (2 IDs)

5152	Broaden range of food she will eat
5158	Increase range of food eaten

To help wash/cleanup one's self (2 IDs)

5113	Can wash himself
5152	Helps wah self in bath

Learns to use cup & utensils (1 ID)

5113	Eat with spoon Drinks from cup by self

N=1...child whose developmental age is 11.0-11.9 months

1 1
ID goal
5166...1

Self-feeds (1 ID)

5166	Feeding self (e.g. gummable finger foods)

N=19...children whose developmental ages are 12.0-12.9 months

19 41
IDs goals
5002...2
5006...2
5053...1
5060...1
5064...2
5071...2
5076...2
5108...1
5109...3
5119...3
5120...2
5122...2
5123...2
5154...2
5162...4
5201...2
5204...4
5208...2
5214...2

To participate in dressing & undressing (14 IDs)

5002	Dresses self
5006	Can dress self
5071	Take off socks To take off a T-shirt
5076	To cooperate & participate in dressing
5109	Dressing self
5119	Undresses self
5120	Assist in dressing
5122	Can undress self & partially dress self
5123	Assists in dressing & undressing
5154	Help in dressing by pushing arms through sleeves, legs through pants
5162	Place one arm/leg in sleeve/pant opening independently
5201	Help with dressing
5204	Help dressing self
5214	Participate in dressing

To help wash/cleanup one's self (7 IDs)

5109	Washing self
5119	Washes hands & face
5120	Assist in bathing
5123	Washes self
5162	Assist in bathtub Become involved in hair care
5204	Wash self
5208	Perform personal hygiene & dressing

Can feed self in a social situation (5 IDs)

5006	Feeds self new food without mess, accepts new food
5119	Independent at table
5122	Can care for self at table, e.g. pour drink
5201	Self feedding table food in social situation
5208	Eat in a social situation

Self-feeds (4 IDs)

5002	Feeds self alone
5120	Self-feeding
5154	Increase range of self-feeding
5204	Self-feed

Learns to use cup & utensils (4 IDs)

5064	To scoop food To hold cup alone
5076	To scoop food onto a spoon
5162	Independent use of spoon
5214	Feed self with utensils

To be toilet trained (2 IDs)

5109	Toilet trained
5204	Toilet training

To progress towards feeding by mouth (1 ID)

5060	To chew

Can take care of own basic needs (1 ID)

5108	Can care for her own basic needs

Ceiling on KID Scale (1 ID)

5053	Ceiling on KIDS

N=11...children whose developmental ages are 13.0-13.9 months

11 22
IDs goals
5003...2
5004...2
5011...3
5052...1
5054...1
5057...2
5058...1
5075...2
5104...3
5173...2
5218...3

To participate in dressing & undressing (8 IDs)

5003	Dress self
5004	Dress self
5011	Dress self
5057	Remove clothing
5075	To cooperate & participate in dressing
5104	Dressing self
5173	To assist to a greater extent in dressing
5218	Participate in dressing

To help wash/cleanup one's self (5 IDs)

5003	Wash self
5011	Grooms self
5057	Wash with help
5104	Washing self
5173	To assist to a greater extent in grooming skills

Self-feeds (5 IDs)

5004	Feed self without a mess using a spoon & fork
5011	Feeds self with little mess
5075	To refine spoon use
5173	To become more proficient at utensil use during eating
5218	Self-feed

Ceiling on KID Scale (3 IDs)

5052	Ceiling on KIDS
5054	Ceiling on KIDS
5058	Ceiling on KIDS

To be toilet trained (2 IDs)

5104	Toileting self
5218	Toilet training

N=0...children whose developmental ages are 14.0-14.9 months

N=0...children whose developmental ages are 15.0-15.9 months

The Kent Scoring Adaptation of the Bayley Scales of Infant Development: Validity and Utility.

Terry Stancin, Virginia Dunn, and Jeanette Reuter

Abstract

The Kent Scoring Adaptation of the Bayley Scales of Infant Development (BSID) is an attempt to produce subscales of the BSID based on the content of the Mental and Motor Scale items. The need for subscales is most apparent to clinicians who assess the developmental status and progress of severely handicapped children, who display large variability in competency in different behavioral areas. This paper reports on three approaches to examining the validity and utility of the Kent Scoring Adaptation when it is used with severely handicapped children: factor analysis, differential diagnostic discriminability, and case examples. Although empirical evidence for the statistical validity of the proposed subscales for the BSID is lacking, the authors suggest research approaches that may lead to statistical support for the Scoring Adaptation.

The Kent Scoring Adaptation of the Bayley Scales of Infant Development: Validity and Utility

Currently, the infant test that is most widely used in research and clinical practice are the Bayley Scales of Infant Development (BSID) (Bayley, 1969). They were developed to clinically assess the developmental status of infants under thirty months of age. Recently they have been used to measure the developmental status of severely handicapped children who possess behavior repertoires similar to infants. The BSID consist of a Mental Scale and a Motor Scale. The information obtained from these two scales is usually represented by summary indices for infants and extrapolated estimates of developmental age (DA) for the handicapped child. While useful as global indicators of developmental status these two developmental indices and DAs are of limited value for descriptive purposes and have no prescriptive utility.

Attempts at establishing subscales of the BSID have been criticized (Bayley, 1969; Hunt & Bayley, 1971). Factor analytic techniques that have been applied to the BSID (Bayley, 1970; Hofstaetter, 1954; McCall, Eichorn, & Hogarty, 1977; Stott & Ball, 1963) and scalogram analyses (Kohen-Raz, 1967) have largely been unsuccessful in creating useful or sufficiently comprehensive subscales. Single factors do emerge in the analyses, but their item loadings vary with the ages of the children included in the sample, the clustering of logically dependent items, and the sample sizes. This suggests that BSID results at different age levels may have different meanings; i.e., the BSID at 3 months is not the same test that it is at 20 months. It may not be fair to assume that those single or primary factors which emerge represent general intelligence, but rather that the factors are simply tapping a very limited range of abilities at any given age (Stott & Ball, 1963). Results of these factor analytic studies have led researchers to suggest that normal infant behaviors cannot be classified into orthogonal ability factors that correlate across ages in infancy. Bayley (1969) noted that any "classification ... is artificial and serves no useful purpose" (p. 3).

However, there have not been any attempts to systematically examine subscales of the BSID when used with high-risk infants or handicapped children. The development of these children does not proceed in even sequences across behavioral areas as does that of normal children. Cerebral palsied (CP) children, for example, may demonstrate lower fine motor capabilities with respect to their cognitive functioning because of the nature of their disability. Thus, summing across fine motor and sensori-cognitive items for CP children may unfairly penalize them for their motor deficits. Therefore, one DA estimate that summarizes the entire Mental Scale of the BSID may not yield useful information for diagnosis or program planning for the handicapped child. DA estimates based on specific behavioral domains may have greater utility and validity in individual cases.

The Kent Scoring Adaptation of the BSID (Reuter, Stancin, & Craig, 1981) permits finer distinctions within the Mental and Motor Scales. BSID items were placed into Cognitive, Language, Social, Fine Motor, and Gross Motor domains on the basis of their item content, and arranged by their item age-norms (Bayley, 1969). The Fine Motor domain consists of items from both the Mental and Motor Scale of the BSID. Overlap exists between some domains and a few items appear in more than one domain. DA estimates that are based on the item age-norms of the BSID Mental and Motor Scales can be derived for each domain. The BSID is first administered and scored according to the standardization instructions (Bayley, 1969). Then, the subscale scores are computed according to the Kent Scoring Adaptation's scoring instructions.[1] The total number (n) of items passed in a domain is computed with the item age-norm of the nth item representing the DA for that domain. The Kent Scoring Adaptation has demonstrated clinical utility among clinicians who have used it to categorize their observations when assessing high-risk infants (Gaither, Note 1) and handicapped children (Stancin, Note 2). However, its psychometric properties have not been established. This paper presents data from the Kent Scoring Adaptations of a large sample of severely handicapped children.

Method

Data Pool

The data pool for the following studies consisted of 121 severely handicapped young children between the ages of one and nine years (mean = 60.9 months) from five different geographic locations in the U.S. All of the children had been diagnosed severely or profoundly retarded (IQ $<$ 35) and most had had multiple diagnoses. Because chronological age and sex account for so little of the variance in developmental levels of this population (Reuter, Archer, Dunn, & White, 1980), subjects were treated as homogeneous with respect to these variables. Different samples were drawn from this data pool for the following studies and case examples.

General Procedure

Psychometricians administered the BSID to each child and then completed the Kent Scoring Adaptation. Within two weeks of the BSID administration a caregiver (mother, teacher, aide, nurse, etc.) completed a Kent Infant Development (KID) Scale (Katoff, Reuter, & Dunn, 1980) for each child. The KID Scale is an infant behavior measure that has been adapted for use with severely handicapped children (Dunn, Stancin, & Reuter, Note 3; Stancin, Dunn, Bickett, & Reuter, Note 4).

Factor Analyses

Two factor analyses were conducted to examine the domain validities of the Kent Scoring Adaptation. Because there was an insufficient sample size to allow analysis by items, domain summary scores were used for both factor analyses. First, raw summary scores for both the five BSID domains and the five KID Scale domains (Cognitive, Motor, Language, Self Help, and Social) for 110 subjects were analyzed. The KID Scale domain scores in this analysis were used as marker variables to try to look at the domain validity of any factors which might emerge.

The resultant 5 x 5 correlation matrix produced coefficients that ranged from .61 to .93 (all $p < .001$) representing the high intercorrelation between the Kent Scoring Adaptation and KID Scale domain scores. When a principle components analysis was applied, therefore, only one factor emerged to account for 81.6% of the total variance, with only one eigen value greater than 1.0 ($\lambda = 8.16$). Because all variables had high loadings on a single factor (factor loadings all $\geq .79$, all communalities $\geq .62$), matrix rotations were not performed.

Findings of a single factor that accounted for most of the variance in these data from handicapped children replicated the results of infant tests with normal infants previously cited. Although the observational formats of the KID Scale and the BSID are different (caregiver reports versus professional administration), all domain scores from both tests were highly intercorrelated. This provides evidence of their concurrent validity as developmental assessment instruments for severely handicapped young children.

A second factor analysis was conducted using only the DAs derived from the Kent Scoring Adaptation domains of 106 children. The domain intercorrelations are presented in Table 1. A principle components analysis again produced a single factor ($\lambda = 4.16$) that accounted for 83.2% of the variance. All factor loadings were greater than .70 and all communalities were above .60. Very similar results were obtained when raw scores were used in place of DAs (one factor accounting for 84.5% of the variance). Thus, it does not appear feasible to assume that as a group severely handicapped young children demonstrate differential behaviors within the Kent Scoring Adaptation domains sufficient to produce separate factors.

Insert Table 1 about here

Diagnostic Discriminability

A study was conducted to begin to examine the usefulness of the Kent Scoring Adaptation for differentiating between diagnostically different groups of severely handicapped children. Selected from the data pool were 53 children with diagnoses that included CP and 40 children who did not have CP as a part of their diagnoses. The 28 children who were not included in this study had diagnoses such that it was unclear to what group they should be assigned.

The Kent Scoring Adaptation domain DAs for the two groups (CP and Not CP) were compared. A 2 x 5 analysis of variance indicated a significant main effect for diagnosis, $F(1, 91) = 10.23$, $p < .01$, and a significant interaction effect of diagnosis x domain, $F(4, 364) = 15.11$, $p < .001$.

Insert Figure 1 about here

Figure 1 is a graph of the mean developmental ages for the two groups from the Kent Scoring Adaptation domains and the original Mental and Motor Scales of the BSID. It is noted that the children with CP are more severely impaired than the Not CP group in every domain, and that the differences are most apparent in the motor subscales.

The results of this study suggest that even with a very gross diagnostic classification the Kent Scoring Adaptation can be useful in differentiating groups. However, it is evident in Figure 1 that little useful information beyond what the BSID Mental and Motor Scales DAs reflect is provided by the addition of the Kent Scoring Adaptation when the means are plotted. These results led us to wonder whether the Kent Scoring Adaptation domain variability that is often seen clinically in multiply-handicapped children is indicative of actual strengths and weaknesses, or merely to illusory ones.

Case Examples

The following are three case examples which illustrate the clinical usefulness of the Kent Scoring Adaptation. The profiles in Figure 2 are of three children selected from the data pool. Child A is a three year old boy whose retardation has been attributed to postnatal tuberous sclerosis. His profile suggests that language abilities are lagging behind other behaviors, particularly social and gross motor. Behavioral observation indicated that this child, in fact, demonstrated very limited vocalizations and little evidence of verbal comprehension. He was, however, able to walk alone, manipulate large and small objects, engage in functional play, and display affection to his caregivers.

Insert Figure 2 about here

Child B is a three year old girl with CP. Her profile suggests that while her motor abilities are extremely limited she possesses language behaviors at a developmental level that is higher than would be predicted by her BSID Mental Scale score alone. This little girl, it turns out, can recognize familiar words and is very responsive to adult vocalizations, but has very little head control, cannot grasp objects, and has poor eye coordination.

Child C is a five year old boy whose mental retardation resulted from non-communicating hydrocephalus. His BSID results suggest that he is functioning at a 19 month level on the Mental Scale and at 9 months on the Motor Scale. Upon examining this little boy's Kent Scoring Adaptation profile there appears to be a marked difference in his language abilities with respect to his other behavioral areas. Behavioral observations and other test data confirmed that this child has a relatively large vocabulary, speaks in sentences, understands commands and social rituals, and responds to verbal communication. However, his motor deficits limit the extent to which he is able to interact with his environment and his perceptual difficulties have resulted in poor eye-hand coordination. Thus, this spike on the Language domain of the Kent Scoring Adaptation alerts the clinician to this child's best avenue for intervention and is helpful for determining appropriate educational placement.

Discussion

The classification of items by the Kent Scoring Adaptation offers the clinician assistance for understanding the relative strengths and weaknesses in an individual child's current behavior repertoire in order to make an appropriate assessment of developmental status and to develop treatment recommendations. Without it, the BSID provides a less complete description of a child. In order to write a psychological report based on BSID results the clinician is left with making tentative hypotheses about various areas of developmental functioning described by individual items. While the psychometric properties of the Kent Scoring Adaptation for use with handicapped children have not been established from research conducted thus far, the promising clinical applicability speaks for a need for further research on the instrument. A future research endeavor may include classifying children having similar domain profiles or DAs and identifying similar developmental and behavioral descriptors for them. Such profile analyses have been shown to be useful with personality inventories, and may prove to be a fruitful manner for using the Kent Scoring Adaptation to describe the developmental status of severely handicapped children.

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Footnotes

This research was supported by Department of Education Research Grant No. DED-G008001794. Views expressed herein do not necessarily represent those of the Department of Education.

[1] The Kent Scoring Adaptation of the BSID is available from Kent Developmental Metrics, 7551 Diagonal Road, Kent, Ohio 44240.

Table 1

Kent Scoring Adaptation of the BSID

Domain Intercorrelations

	Cognitive	Language	Social	Fine Motor	Gross Motor
Cognitive	1.000	.774	.870	.959	.809
Language	-----	1.000	.807	.759	.594
Social	-----	-----	1.000	.817	.632
Fine Motor	-----	-----	-----	1.000	.847
Gross Motor	-----	-----	-----	-----	1.000

N = 106

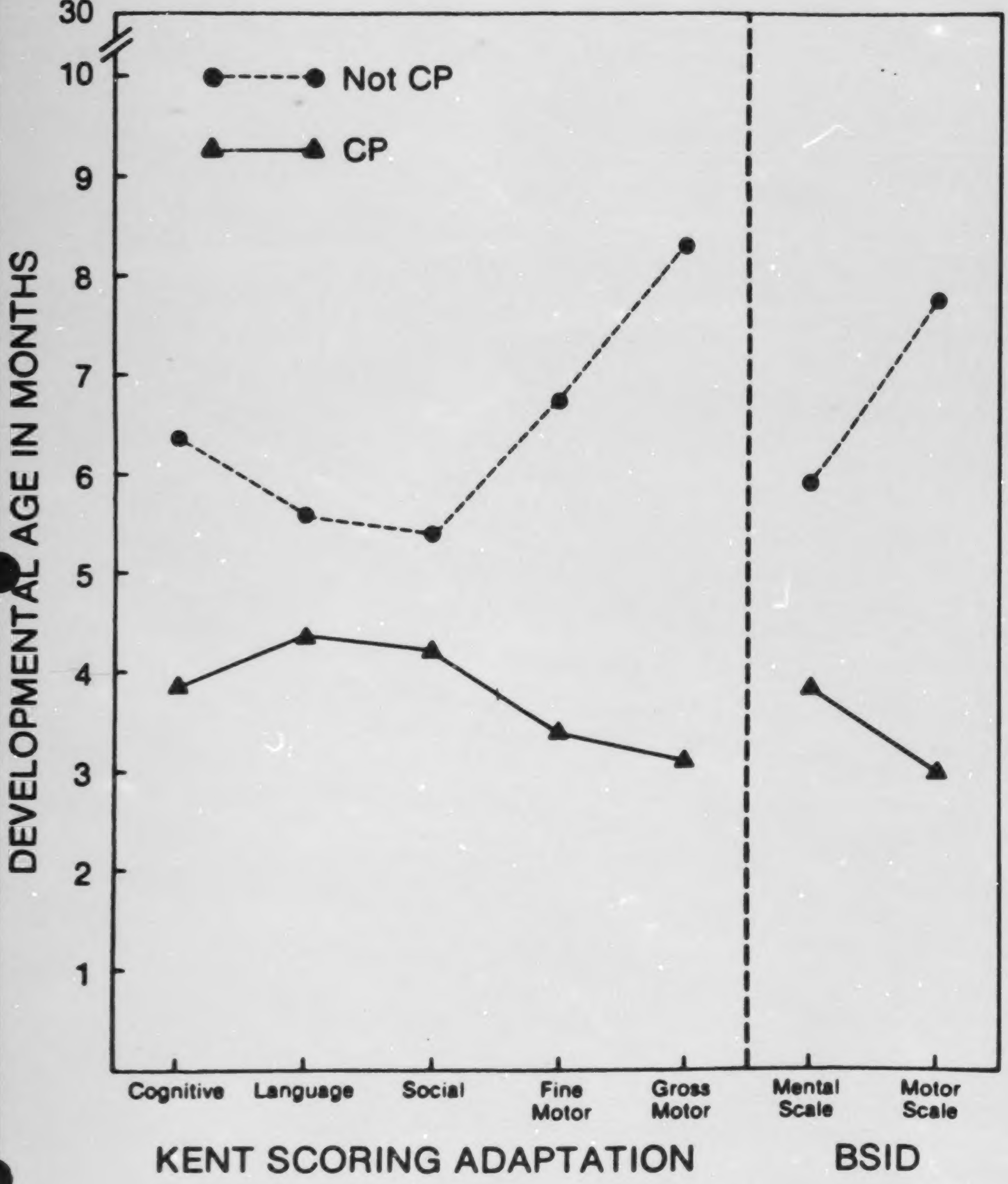
All $p < .001$.

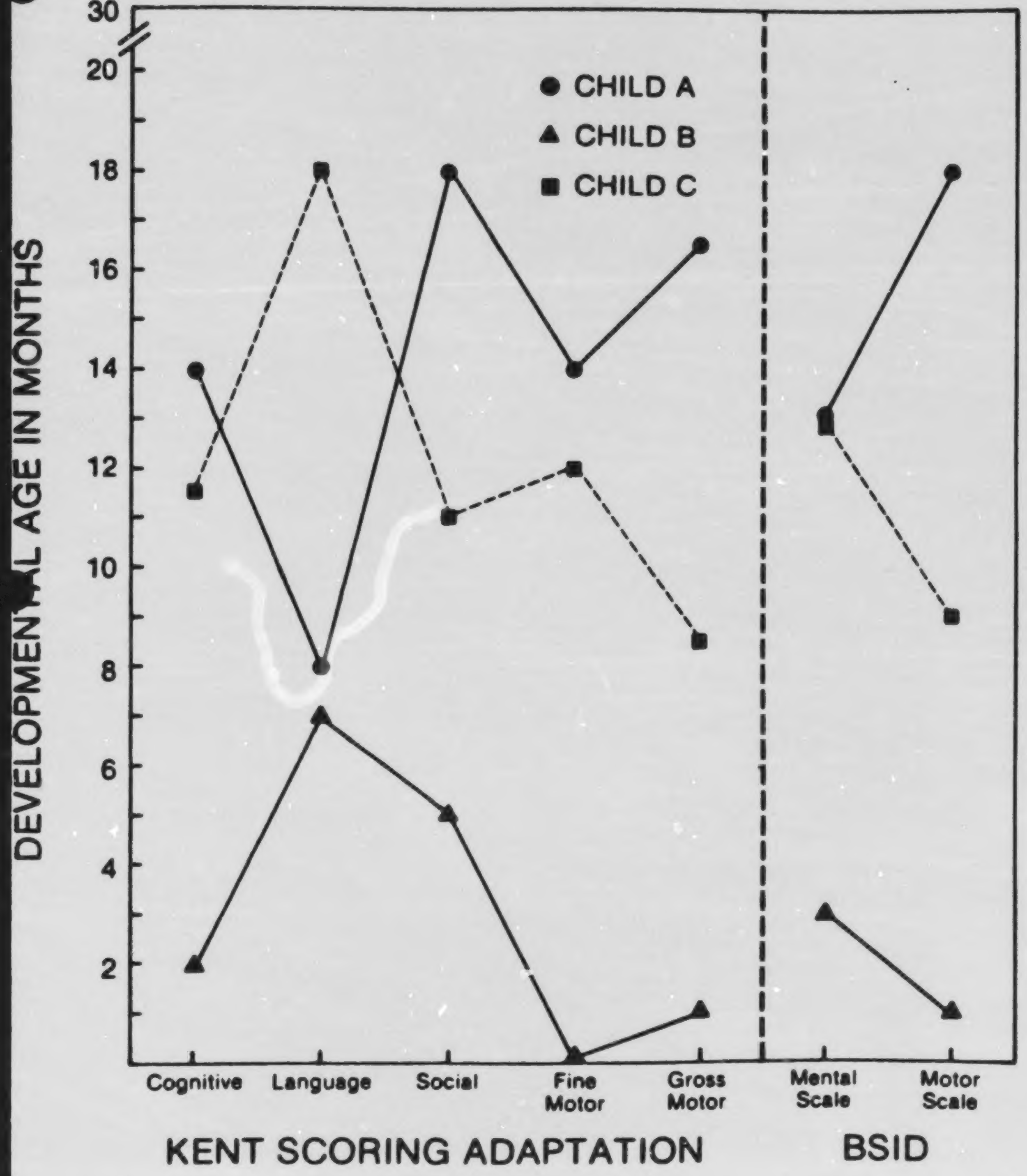
Figure Caption

Figure 1. Mean DAs for severely handicapped children with cerebral palsy (CP) and without cerebral palsy (Not CP) on the Kent Scoring Adaptation and the BSID.

Figure Caption

Figure 2. DAs for three severely handicapped children on the Kent Scoring Adaptation and the BSID.


30
10
9
8
7
6
5
4
3
2
1
DEVELOPMENTAL AGE IN MONTHS
Not CP
CP
Cognitive
Language
Social
Fine Motor
Gross Motor
Mental Scale
Motor Scale
KENT SCORING ADAPTATION
BSID



30
20
18
16
14
12
10
8
6
4
2
DEVELOPMENTAL AGE IN MONTHS
● CHILD A
▲ CHILD B
■ CHILD C
Cognitive
Language
Social
Fine Motor
Gross Motor
Mental Scale
Motor Scale
KENT SCORING ADAPTATION
BSID

THE FIRST CHANCE PROJECT

Jeanette Reuter

In G. Callis (Ed.), Avenues to Access, Kent State University, 1982.

I. Description of Research/Project

A. Title

Kent State University
Project First Chance

The Use of Caregiver Information to Design Habilitation Programs for Severely and Profoundly Handicapped Young Children.

B. Funding Source

U.S. Department of Education,
Office of Special Education

C. Target population

Moderately, severely and profoundly handicapped young children.

D. Duration of the research project

Kent State University's First Chance Project is in its eighth year of U.S. Department of Education or Bureau of Education for the Handicapped funding. A demonstration project was carried out from 1974 to 1977, whose purpose was to aid in developing a physical and social environment responsive to the behaviors of the severely handicapped young children who lived at the Hattie Larlham Foundation, a JCAH-MR accredited, intermediate care facility in Mantua, Ohio. In the years from 1977 to 1980, K.S.U.'s First Chance Project was involved in an Outreach Project whose purpose was to disseminate and replicate programs developed during our demonstration years. Our current work is concerned with using teachers' and parents' observations of the handicapped young children they care for, to design educational and habilitation interventions. Our staff is Jeanette Reuter, Principal Investigator; Virginia Dunn, Research Director; Berendina DeVries, Project Manager; and Terry Stancin, Research Associate.

II. Goals and Objectives

A. Specification of need

In order to be helpful and successful in the habilitation of young handicapped children, medical, educational and habilitational interventions must begin during the first years of a child's life. They must be carefully planned to enhance a child's acquisition of the broadest possible, functional behavioral repertoire. Lastly, the interventions must be carried out, largely, by the child's daily caregivers because the interventions cannot depend completely on professionals due to considerations of cost and availability.

The necessary early intervention requires early screening, diagnosis, and programming which must be based on the reliable measurement of what a child can do, what his/her behavioral strengths and weaknesses are and what she/he will be ready to learn next. KSU First Chance Project has developed a behavioral inventory to meet this need called the Kent Infant Development Scale or KID Scale.

B. Statement of goals and objectives

The purpose of the current two year research project is to develop a model for using caregiver information to design individual habilitation plans (IHP) for handicapped children. The model, in the first year, will be developed and evaluated for severely and profoundly handicapped young children.

The IHP's for the severely/profoundly handicapped children will be derived from caregiver information about the child's behavioral competencies. This information will be gathered and structured by the use of the Kent Infant Development Scale (KID Scale) (Katoff, Reuter, and Dunn, 1980), an inventory of behaviors characteristic of the first year of normal development. Research studies will be carried out to make information reported via the Kent Infant Development Scale as reliable and valid as possible.

This model then, in the second year, will be extended to moderately handicapped children whose parents and teachers will provide the developmental information on the Minnesota Child Development Inventory (MCDI) (Ireton and Thwing, 1974). The MCDI reports will be used to design their individual habilitation plans.

In the model we propose to develop, caregiver information is not expected to take the place of professional evaluations, interdisciplinary staffings or applied behavior analysis. However, the model does involve the caregiver in the individual program planning from the very beginning, during the assessment stages. The model should make it possible to develop an individual habilitation plan which can be applied by a non-professional caregiver in combination with, not in addition to, the daily care responsibilities for the children in her charge. The caregiver assessment and the individual habilitation recommendations that derive from it, may be seen as the caregiver's contribution to interdisciplinary staffings for preparing and reviewing a child's individual habilitation plan.

Eventually, use of the caregivers' input may reduce or replace a portion of the expensive professional assessments, programming and reviews while at the same time, contributing an important new source of information. How much professional input can be reduced must remain a question until we can evaluate the operation of the model in situ. These are the tasks we have set for ourselves in our current year's research.

C. Description of methods used in the implementation

The two instruments used to measure the developmental status of handicapped young children by soliciting the observations of their caregivers are the KID Scale and the MCDI.

The KID Scale is an inventory of 252 sentence stems that describe behaviors characteristic of the first year of an infant's life. The stems are to be rated by the caregiver of the infant or handicapped child. The 252 behavioral descriptions are divided into five domains on the basis of their content: cognitive, motor, social, language and self-help. This inventory of behavior items, developed, standardized, and age-normed on 357 presumed healthy infants, is appropriate for evaluating the developmental status of both infants and handicapped young children.

The KID Scale can be used to assess the developmental status of presumed healthy infants, high risk infants, and handicapped young children. It can provide a basis for starting educational programming for developmentally delayed children at the earliest possible age. It can evaluate the developmental effects of stimulation programs for normal and high risk infants. It can be used to teach caregivers how to observe and interact with their infants.

The Minnesota Child Development Inventory (MCDI) is an inventory of 320 sentence stems that describe behaviors characteristic of children from 1 to 6 years of age. A caregiver of the child to be assessed marks on an answer sheet which sentences describe her or his child's behavior just as on the KID Scale. After it has been scored, the MCDI provides a measure of the child's current developmental status on a profile of eight developmental domains: General Development, Gross Motor, Fine Motor, Expressive Language, Comprehension-Conceptual, Situation Comprehension, Self-Help and Personal-Social. This inventory was normed on two samples of healthy children, one of 887 children and one of 796 children six months to six and one half years of age.

Since both of these instruments were normed and standardized on presumed healthy children, the first task of our research is to use these instruments on samples of handicapped children whose developmental ages are appropriate for the tests. The reliability and validity of both instruments when used with handicapped children will be determined. The KID Scale can be used for severe and profoundly handicapped children under the age of 10 years while the MCDI can be used for moderately handicapped children 6-10 years of age.

The second research task is to design computer scoring routines to yield lists of behaviors ordered by their age of acquisition by domain for both the KID Scale and the MCDI. Such orderings will reveal what behaviors a child can perform currently and what behaviors a child is about to learn. The group of behaviors a child is ready to learn can be drawn from norms set by other handicapped children and their caregiver's observations.

D. How will results be applied?

The assessment tools, the KID Scale and MCDI, with a sound psychometric basis developed for use with handicapped children and with accompanying prescriptive programming applications, can be used to design individual habilitation programs for young handicapped children. The child's caregivers can contribute directly to the program design and will be able to cooperate with the program implementation. The assessments on which the programming is based will have been modified for use with the population of handicapped young children.

It is hoped that this research will accomplish two purposes: to reduce the amount of time that professional caregivers need to spend on assessment and thus to free them to spend more time on program design and intervention, and to maximize the contribution of the direct caregiver in the child's habilitation program.

III. Current Status

A. Accomplishments to date

At the end of the first year of our two year project, the developmental status of 120 severely handicapped young children has been assessed using KID Scales completed by their mothers and other caregivers. Data were gathered in five different geographical areas of the United States. KID Scale assessment results have been compared with the developmental status obtained from the Bayley Scales of Infant Development (Bayley, 1969), a professionally administered psychological test. Individual habilitation plans have been designed for each child from these data and have been made available to each child's caregiver for evaluation. Preliminary analyses of these data suggest the KID Scale is a reliable and valid instrument for evaluating the developmental status of severely handicapped children.

The model, using the KID Scale, established in this first year of research with severely and profoundly handicapped young children is now being applied to 100 moderately handicapped young children using the MCDI. We are again setting up a geographically dispersed group of four field workers to collect the data which will be analyzed in the same way as in year one.

At the same time that this research is being conducted, the KID Scale assessment and habilitation planning model is being used at three educational and residential institutions for severely handicapped young children.

B. Concerns yet to be addressed

The Kent Infant Development Scale, as it currently stands, needs to be modified in a second edition so that it will be more appropriate in terms of items and norms for a handicapped sample. The results from the first year's research will be used to rewrite the manual and test booklet of the KID Scale, to adjust the norms, and to design specific interpretation guidelines for handicapped children.

C. First Chance Project Publications

1. Dunn, V., Stancin, T. & Reuter, J. The adaption of an infant behavior measure for severely handicapped young children. Midwest Psychological Association, 1981.
2. Katoff, L. The Development and Evaluation of the KID Scale. (Doctoral Dissertation, Kent State University, 1978).
3. Katoff, L. and Reuter, J. A listing of infant tests. JSAS Catalogue of Selected Documents in Psychology, 1979, *9*, (Ms. No. 1918) 18 pp.
4. Katoff, L. and Reuter, J. Review of developmental tests for infants. *Journal of Child Clinical Psychology*, 1980, Spring, pp. 30-34.
5. Katoff, L., Reuter, J. and Dunn, V. The Kent Infant Development Scale. Kent, Ohio: Kent State University, 1980.
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8. Reuter, J., Katoff, L., and Dunn, V. The development and perscriptive uses of the KID Scale. *Proceedings of Prevention of Psychosocial Disorders in Infancy: Emerging Perspectives for the 80's*, 1981, 88-90.

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Ireton, H. and Thwing, E. The Minnesota Child Development Scale (2nd ed). Minneapolis, Minnesota: Behavior Science Systems, 1974.

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The Reliability and Validity of the Minnesota Child Development Inventory Used with Moderately Handicapped Schildren in Primary School.

James Moe, Paper from Ph.D. Dissertation.

The validity and utility of the caregiver completed Kent Infant Development Scale for assessing the developmental status of severely and profoundly handicapped children was demonstrated in the first year of this grant. The focus of the research in the second year was to explore the advantages and disadvantages associated with a caregiver report of adaptive and intellectual behaviors to describe the developmental status of young moderately retarded children in the primary grades of public special education classes. The caregiver report used was the Minnesota Child Developmental Inventory (Ireton and Thwing, 1974) and it was compared to the Stanford Binet (Terman and Merrell, 1973).

The Minnesota Child Developmental Inventory (MCDI) was chosen as the caregiver completed instrument because the range of behaviors it covers is developmentally appropriate for describing moderately retarded young children. The MCDI consists of 320 statements which describe the behaviors of children from 1 to 6 1/2 years of age. This range of behaviors corresponds to the developmental level of 5 to 10 year old moderately retarded children. Caregivers record whether or not children display the behaviors on a yes/no format. The 320 items are divided (on a face content basis) into eight developmental domains: general development(GD), gross motor(GM), fine motor(FM), expressive language(EL), comprehension-conceptual(CC), self help(SH), and personal-social(PS). Developmental age levels are obtained on each of these domains.

The Stanford Binet was chosen as the best comparison instrument because of the wide age and ability range of its applicability and the solid base of psychometric research on its properties. The Wechsler Primary and Preschool Scale of Intelligence (Wechsler, 1967) is appropriate for children between four and six and one half years of age and the Wechsler Intelligence Scale for Children - Revised (Wechsler, 1974) is appropriate for children between six and almost seventeen years of age. The age ranges for neither of these two tests were developmentally or chronologically appropriate for our five to ten year old moderately retarded sample of children. The McCarthy Scales of Children's Abilities (McCarthy, 1972) was not used because its appropriateness for assessing young moderately retarded children has not been determined. Since the Stanford Binet (SB) has been widely criticized for its emphasis on verbal development, those items which require a verbal answer were seperated from those which do not and a seperate mental age (MA) was calculated from each scale as well as the MA from the entire SB.

The primary purpose of this study was to determine the substitutability of the MCDI for the SB for assessing the developmental status of moderately retarded young children. Interjudge reliability estimates were obtained on mother-completed and teacher-completed MCDIs. Concurrent validity estimates were obtained by correlating MCDI developmental age(DA) estimates with SB MAs and by comparing mean DAs with mean MAs. In addition to these primary concerns, two other issues were explored. The properties of the Language and

Nonlanguage scales (developed for this study) of the SB were evaluated. Also, since the total sample had a preponderance of Down's Syndrome children, two subscales were formed (comprised of Down's and nonDown's moderately retarded children) and the developmental age levels of these subsamples were compared.

METHOD

Four field consultants and home office staff located the children for this study. The consultants were: Fran Archer (Florida); Cindy Legin-Bucell (Georgia); Anne Copeland (Massachusetts); and, Phil Piro (Ohio).

Subjects

Data was collected on 100 children. Seven children were eliminated from statistical analyses because of incomplete data or extreme deviation from the requirements for participation which defined the sample (IQ between 35 and 51, 5 - 10 years of age). The final sample consisted of 93 moderately retarded children. The mean age of this sample was 98 months. The mean mental age was 43 months and the mean IQ was 43. Fifty-nine of the children were male and 34 were female. The children were attending a public school program or its equivalent and they were living at home or in a group home. Permission for participation in this study was obtained for each child from both the public school system and the child's legal guardian.

Ninety-three homecaregivers completed MCDIs on the children. Seventy-six of the home caregivers were mothers, five were foster-mothers, four were fathers, and eight were other home caregivers. The home caregivers averaged 12.4 years of education. The mean length of time caring for the children was 92 months.

Ninety-three educational caregivers completed MCDIs on their students. Sixty-four of the educational caregivers were teachers, 22 were teacher's aides, and seven were other educational caregivers. These caregivers averaged 15.5 years of education and the mean length of time caring for the children was 11 months.

Procedure

One of the four consultants or home office staff administered a Stanford Binet to each of the children of the experimental sample. Within two weeks of this test administration, two MCDIs were collected, one from each child's home caregiver and one from each child's educational caregiver. Each child had a unique pair of caregivers completing MCDIs. A psychological test report was written based on the multi-source data and the reports were made available to the teachers and, through the teachers, to the parents.

RESULTS

Interjudge Reliability

Reliability estimates were obtained by comparing MCDI scores on the same children from two different sources. Raw scores and developmental ages from parent and teacher reports for each of the developmental scales plus the Full Scale were correlated. Raw scores were simply the total number of endorsements within each scale. All correlation were Pearson product moment r's. Parent derived and teacher derived developmental age estimates for each developmental scale were compared with dependent t tests.

Correlations between parent derived and teacher derived raw scores for each developmental scales were highly significant (all p values $< .001$). The correlations ranged from .8785 for the General Development scale to .6271 for the Personal-Social scale (see Table I).

Developmental age estimates from parents and teachers were also highly correlated (all p's $< .001$). Again, the General Development scale showed the highest correspondence between parent and teacher reports with $r = .8657$ and the correlation for the Personal-Social scale was the lowest with $r = .5704$ (see Table I).

Comparisons of mean developmental ages for each scale from parent and teacher reports show that parent estimates were typically higher than teacher estimates. Parent derived DAs

Table I

Correlations between MCDI Scores from Parent and Teacher Reports

Domains	Raw Scores	Developmental Ages
General Development	.8785	.8657
Gross Motor	.8021	.6252
Fine Motor	.6825	.6972
Expressive Language	.8142	.7603
Comprehension-Conceptual	.8430	.8116
Situation Comprehension	.6645	.6155
Self Help	.6754	.6687
Personal-Social	.6271	.5704
Full Scale	.8219	.8057

all p's $< .001$

were significantly different and higher than teacher derived DAs for all scales except for Gross Motor and Fine Motor. Parent and teacher derived DAs were not significantly different for the Gross Motor and Fine Motor scales (see Table II).

Validity

Validity estimates were obtained in a variety of ways. Developmental age estimates from parent and teacher completed MCDIs were correlated with the criterion variable, Stanford Binet Mental Age (MA). To check the assumption that the MCDI was sensitive to developmental progression related to age for moderately retarded children, MCDI DAs were correlated with the children's chronological ages. Again, all correlations were Pearson product moment r's. Developmental age estimates from parent and teacher reports were compared with SB MAs with dependent t tests to assess whether the two different methods for arriving at age estimates resulted in different values.

All correlations between MCDI DAs from parent reports and SB MAs were highly significant (all p's $< .001$). The General Development DA and the SB MA were the most highly correlated scores with $r = .7534$. The correlation between Gross Motor DA and SB MA was the lowest correlation with $r = .3676$ (see Table III).

The correlation between MCDI DAs from teacher reports and SB MAs were also highly significant (all p's $< .001$). Again, the highest correlation was between General Development DA

Table II

Parent vs. Teacher Developmental Age Mean Scores

Domains	Parent Mean DA	Teacher Mean DA	t Value	Significance Level
GD	38.14	35.79	3.30	$p < .001$
GM	38.37	37.41	0.67	$p > .10$
FM	45.39	45.20	0.17	$p > .10$
EL	29.88	27.78	3.83	$p < .001$
CC	38.36	35.01	3.90	$p < .001$
SC	37.33	32.66	4.59	$p < .001$
SH	45.13	42.12	2.25	$p < .05$
PS	34.05	30.04	3.55	$p < .001$
FS	39.57	37.02	4.27	$p < .001$

Table III

Correlations Between Parent and Teacher Derived MCDI Developmental Ages and SB MA

MCDI Domains	Parent DAs with SB MA	Teacher DAs with SB MA
General Development	.7534	.8160
Gross Motor	.3676	.4737
Fine Motor	.6754	.7236
Expressive Language	.5668	.6830
Comprehension-Conceptual	.7406	.7662
Situation Comprehension	.5308	.5206
Self Help	.5949	.6271
Personal-Social	.5292	.5292
Full Scale	.7354	.7954

all p's $< .001$

and SB MA (r = .8106) while the lowest correlation was between Gross Motor DA and SB MA with r = .4737 (see Table III).

Correlations between MCDI DAs and chronological age show that developmental progression as measured on the MCDI and chronological age are significantly related. The developmental scales that showed the highest relationship (p's $<$ .001) between chronological age and DAs from both parent and teacher reports were General Development, Fine Motor, Comprehension-Conceptual, Self Help, and Full Scale (see Table IV).

Comparisons of mean MCDI DAs with mean SB MAs show that, on the whole, MCDI DAs are lower than SB MAs (see Table V). The mean overall DA estimate from the MCDI, obtained from the General Development scale, was significantly lower than the mean SB MA for both parent and teacher reports. The parent derived mean DA was approximately 4.5 months lower than the mean SB MA and the teacher derived mean DA was approximately 7 months lower than the mean SB MA. The Self Help DA, from both parent and teacher derived reports, was the only developmental scale which was not significantly different from the SB MA. The Fine Motor DA from both parent and teacher reports was the only scale score which was significantly higher than the SB MA. All other MCDI behavioral domain DAs were significantly different from and lower than the SB MA.

Stanford Binet Subscales

Two experimental scales of the Stanford Binet were developed for this study - the Language Scale and the Nonlanguage Scale. The Language Scale consisted of all SB items which required a

Table IV

Correlations between Parent and Teacher Derived
MCDI Developmental Ages and SB CA

MCDI Domains	Parent DAs with SB CA	Teacher DAs with SB CA
General Development	.4736***	.4904***
Gross Motor	.1787*	.3205***
Fine Motor	.4483***	.4736***
Expressive Language	.2352**	.2331**
Comprehension-Conceptual	.4482***	.5164***
Situation Comprehension	.2280**	.3971***
Self Help	.4217***	.4245***
Personal-Social	.3017**	.2173**
Full Scale	.4183***	.4634***

***p .001
**p .02
*p .05

Table V

Mean Comparisons between MCDI DAs and SB MA

MCDI Domains	Parent Derived Mean DA	MA	t - value	Significance Level
GD	38.14	42.68	4.94	$p < .001$
GM	38.37	42.68	2.64	$p < .01$
FM	45.39	42.68	2.51	$p < .02$
EL	29.88	42.68	13.58	$p < .001$
CC	38.36	42.68	4.40	$p < .001$
SC	37.33	42.68	4.68	$p < .001$
SH	45.13	42.68	1.76	$p > .05$
PS	34.05	42.68	7.38	$p < .001$
FS	39.57	42.68	4.00	$p < .001$

MCDI Domains	Teacher Derived Mean DA	MA	t - value	Significance Level
GD	35.79	42.68	8.82	$p < .001$
GM	37.41	42.68	3.54	$p < .001$
FM	45.20	42.68	2.61	$p < .01$
EL	27.78	42.68	18.20	$p < .001$
CC	35.01	42.68	9.12	$p < .001$
SC	32.66	42.68	9.32	$p < .001$
SH	42.12	42.68	.46	$p > .10$
PS	30.04	42.68	11.49	$p < .001$
FS	37.02	42.68	8.34	$p < .001$

verbal response and the Nonlanguage Scale consisted of all items which did not require a language response. Mental ages were calculated for each scale by considering each scale as a shortened version of the entire SB. The correlation between the Language MA and the Nonlanguage MA was highly significant with r = .8189. Correlations between Language MAs and Nonlanguage MAs with MCDI DAs were also highly significant (see Table VI). General Development and Comprehension - Conceptual were the most highly correlated of the MCDI scales withe the SB scales. The Expressive Language scale had the highest absolute difference in its correlations with the Language and Nonlanguage SB scales and it was more highly correlated with the Language Scale than the Nonlanguage Scale. All correlations were, again, Pearson product moment r's.

Mean comparisons were performed with dependent t tests to determine how Language and Nonlanguage MAs compared with each other, SB MA, and GD DA (see Table VII). The mean Nonlanguage MA was significantly higher than the mean Language MA, the mean SB MA, and parent and teacher derived MCDI GD DAs. The mean Language MA was significantly lower than the mean Nonlanguage MA and the mean SB MA, but significantly higher than both parent and teacher derived MCDI GD DA means.

Diagnosis

The total sample of 93 children was divided into two independent groups. The Down's group consisted on 41 children

Table VI

Correlations between Parent and Teacher Derived MCDI DAs with
SB Language MA and SB Nonlanguage MA

MCDI Domains	Parent MCDI DAs with Language MA	Parent MCDI DAs with Nonlanguage MA	Teacher MCDI DAs with Language MA	Teacher MCDI DAs with Nonlanguage MA
GD	.7614	.7089	.8199	.7688
GM	.2876*	.3490	.4229	.4441
FM	.5773	.6850	.6636	.6912
EL	.6920	.4641	.7924	.5619
CC	.7520	.7010	.7826	.7274
SC	.5095	.4776	.4850	.4906
SH	.5432	.5875	.6052	.5982
PS	.4947	.5020	.5278	.4870
FS	.7282	.6912	.7983	.7362

All p's $<$ .001 except "*", which was p $<$ .003.

Table VII

Mean Comparisons with Language and Nonlanguage Scales

Comparisons	Means	t Value	Significance Level
Language MA with Nonlanguage MA	41.01 45.78	5.44	.001
Language MA with SB MA	41.01 42.68	2.47	.015
Nonlanguage MA with SB MA	45.78 42.68	8.13	.001
Parent MCDI GD DA with Language MA	38.14 41.01	2.82	.006
Teacher MCDI GD DA with Language MA	35.79 41.01	5.93	.001
Parent MCDI GD DA with Nonlanguage MA	38.14 45.78	7.43	.001
Teacher MCDI GD DA with Nonlanguage MA	35.79 45.78	11.12	.001

who were diagnosed with Down's Syndrome. The NonDown's group was a heterogeneous group which consisted of 52 moderately retarded children who were not diagnosed with Down's Syndrome. The average age of the Down's group was 96.6 months and the average age of the NonDown's group was 98 months. These mean ages were not significantly different. The mean scores for these two groups were compared with t tests for independent means on all parent derived MCDI domains, SB MA, and Language and Nonlanguage MAs.

Results of these comparisons revealed that the Down's group scored significantly higher ($p < .05$) on all MCDI scales except for the Expressive Language scale, where no difference was noted. No significant differences were found between these two groups on mean SB MA, mean Language MA, or mean Nonlanguage MA.

DISCUSSION

Very satisfactory interjudge (parent/teacher) reliability (r > .80) for the DAs based on the MCDI scales of General Development, Full Scale, and Comprehension-Conceptual were obtained. The rest of the scales had interjudge reliability coefficients in the .6 to .8 range while only the Personal-Social scale was below .60. The DAs derived from parent reports on the MCDI scales of General Development, Expressive Language, Comprehension-Conceptual, Situation Comprehension, Self Help, Personal-Social, and Full Scale were significantly higher than the DAs derived from teacher reports. Differences ranged from 2.1 to 5.7 months. Only on the DAs derived from the Fine Motor and Gross Motor scales were the differences between parents and teachers not significant. Thus, parents and teachers ranked the children similarly but parents saw their children performing a higher range of behaviors than teachers. The MCDI is, of course, designed to be used by mothers and the norms are constructed from that source of data. Therefore, when both reports are available, DAs should be calculated using mother data.

When the DAs calculated from mother and teacher MCDI responses are compared with MAs obtained from the Stanford Binet, teachers' results always have a higher correlation. However, since in general all MCDI DAs were lower than SB MAs and since parent DAs were in general lower than teacher

DAs, it is not surprising that DAs based on parents' reports come closer to SB MAs. Again, this would indicate that it is preferable to rely on mothers' reports, but if these are unobtainable teachers' reports can be substituted with some caution.

With this sample of moderately retarded children, as with the MCDI normative sample, the General Development scale was the best measure of DA in terms of reliability and validity. The GD scale had the highest interjudge reliability correlations and the highest correlation with Stanford Binet MA.

The older children in this moderately retarded sample had higher scores than the younger children, although the correlations of MA and DA with CA are smaller than those obtained with normal children where the correlations would approach 1.0 with a perfectly reliable test. Again, the General Development scale (and the Full Scale) had the highest correlations. Expressive Language, Personal-Social, and Gross Motor DAs appeared to improve only slightly with age.

Although the Language and Nonlanguage SB scales were highly correlated with each other there was some evidence with this sample that they were measuring differences in verbal vs. nonverbal tasks. The lowest correlation was between the Language score and the parent reported Gross Motor score. The MCDI Expressive Language DA correlated .69 with the Language score but only .46 with the Nonlanguage score, a difference replicated by the teachers' data. The Language scores were lower than the Nonlanguage scores for the sample as a whole. Thus, this breakdown may be a helpful one for moderately retarded children. Whether this is an artifact awaits the demonstration in a normal sample.

The Down's Syndrome children did not differ from the NonDown's moderately retarded children on any of the Stanford Binet measures. Developmental ages from the MCDI, however, were consistently higher for the Down's Syndrome children on all MCDI scales except for the Expressive Language scale. So although there is no difference between these two groups' performance on standard intellectual tasks, parents' rated their Down's Syndrome children as performing a higher range of behaviors, except in expressive language skills, than their moderately retarded NonDown's Syndrome children.

The Use of the McCarthy Scales of Children's Abilities to Assess Mentally Retarded Children.

Laura Bickett, Terry Stancin, Virginia Dunn, Jim Moe,
and Jeanette Reuter.

Abstract

The validity of mentally retarded children's mental age (MA) scores as derived from the McCarthy Scales of Children's Abilities (MSCA) was investigated. Twenty-one moderately mentally retarded children were administered the MSCA, the Stanford-Binet Intelligence Scale, and a mother-completed developmental assessment instrument, the Minnesota Child Development Inventory (MCDI). Because research findings have indicated that MSCA standard scores are not valid estimates of the abilities of mentally retarded children, MAs were derived from the MSCA standardization data and compared with Stanford-Binet MAs and MCDI General Development Scale developmental ages (DAs). The General Cognitive Scale of the MSCA correlated highly and significantly with both the Stanford-Binet and the General Development Scale of the MCDI. There were no significant differences among mean scores or correlations for these three measures. The MAs from the five specific Scales of the MSCA also correlated highly and significantly with the Stanford-Binet and the MCDI General Development Scale. It was concluded that the MSCA can yield valid information about the abilities of mentally retarded children when MA scores are used. Limitations and advantages of MA scores were discussed.

The Use of the McCarthy Scales of Children's Abilities to Assess Mentally Retarded Children

The McCarthy Scales of Children's Abilities (MSCA) is an instrument designed to assess the cognitive and motor abilities of children aged 2½ to 8½ years. Standard scores (Indexes) are derived from each of six Scales: Verbal, Perceptual-Performance, Quantitative, General Cognitive, Memory, and Motor (McCarthy, 1972). The General Cognitive Index (GCI) provides a measure of the general intellectual level of the child and has properties that are similar to conventional IQs (mean of 100, standard deviation of 16). The MSCA has been seen as more advantageous than conventional IQ tests, such as the Stanford-Binet, because of the provision of Scale Indexes which measure specific abilities, the inclusion of gross and fine motor tasks, the child-oriented contemporary nature of its tasks, the length and sequencing of the individual tests, and an age appropriate range which allows it to be used with both preschool and primary grade children (Gerken, Hancock, & Wade, 1978; Kaufman & Kaufman, 1977; Phillips, Pacework, & Tindall, 1978). In addition, McCarthy (1972) felt the MSCA would be useful for assessing the abilities of mentally retarded children because of the inclusion in the test of a number of tasks appropriate for very young children. Despite its several as-sets and seeming appropriateness for the assessment of mentally retarded children, the MSCA has proven difficult to use with some mentally retarded children.

Research studies which have compared the MSCA to conventional IQ tests have provided evidence of the MSCA's validity when used to assess the general intellectual level of normal children. Nagle (1979) reviewed the reliability and validity studies of the MSCA and reported, for samples of normal children, correlation coefficients between the GCI and IQs from the Stanford-Binet or Wechsler Preschool and Primary Scales of Intelligence that ranged from .71 to .91. In only two of these studies were significant differences reported between the GCI and IQ means. Since Nagle's review, investigators who have compared the performance of normal children on the MSCA to their performance on the Stanford-Binet and the Wechsler Intelligence Scale for Children-Revised (WISC-R) have continued to report moderate to high correlations between the GCI and the IQ and no significant mean differences (Ivimey & Taylor, 1980; Levenson & Zino, 1979; Naglieri, 1980).

The findings from studies in which learning disabled and mentally retarded children have been the subjects of investigation suggest the use and interpretation of the MSCA may be problematic with such populations, particularly mentally retarded children. Researchers who have compared the performance of learning disabled children on the MSCA to their performance on conventional IQ tests have reported correlation coefficients ranging from .40 to .70 and mean GCI-IQ discrepancies of 5 to 15 points, with the IQ consistently higher than the GCI (DeBoer, Kaufman, & McCarthy, cited in Nagle, 1979; Goh & Younquist, 1979; Ivimey & Taylor, 1980; Kaufman & Kaufman, 1974; Naglieri, 1981). Two studies which compared the performance of educable mentally retarded (EMR) children on the MSCA to their performance on the Stanford-Binet reported mean IQs 18 to 20 points greater than mean GCIs (Levenson & Zino, 1979; Naglieri & Harrison, 1979). Investigators in both studies were unable to table GCIs for several of their subjects using the MSCA normative tables. These tables present GCIs and Scale Indexes that extend slightly beyond 3 standard deviations in either direction from the mean (McCarthy, 1972) and should be sufficient to describe the performance of an EMR child. However, the raw scores obtained by some of the EMR children in these studies called for the assignment of GCIs below 50, which is the lowest GCI obtainable from the MSCA normative tables. Therefore, extrapolated GCIs were assigned according to the tables derived by Harrison and Naglieri (1978). Naglieri and Harrison (1979) found that even with a table of extrapolated GCIs extending 4½ standard deviations below the mean, the performance of six of their EMR subjects could not be described. All of these subjects had to be assigned the lowest possible extrapolated Index of 28. Harrison and Naglieri (1978) have warned that extrapolated Indexes should be regarded as estimates and used with caution because they are derived from a formula and are not based on the actual performance of the standardization sample.

Harrison, Kaufman, and Naglieri (1980) investigated the profiles of 40 EMR children on the MSCA and reported that their GCIs ranged from 27 to 76, with a mean of 51.6 (these investigators also found it necessary to assign some extrapolated GCIs). Mean Indexes on the other MSCA Scales could not be computed because too many of the EMR children scored below 3 standard deviations from the mean of the Scales. The range and mean for the sample's GCIs is of interest in light of the fact that the children had been placed in special education programs on the basis of previous Stanford-Binet or WISC-R IQs between 55 and 69. If the GCIs had been taken as equivalent to IQs some children would have been identified as too low functioning to be in an EMR classroom. Naglieri (1981) reported a mean GCI 7 points lower than a mean WISC-R for a sample of 20 EMR children. In this study it was apparently possible to table GCIs for all subjects with the MSCA normative tables.

These findings have led some investigators to suggest that the IQ and the GCI are not comparable, particularly for learning disabled and mentally retarded children, and that classification of a child on the basis of a low GCI should be undertaken with caution, if at all (Bracken, 1981; Goh & Younquist, 1979; Harrison et al., 1980; Ivimey & Taylor, 1980; Levenson & Zino, 1979; Nagle, 1979; Naglieri & Harrison, 1979). Thus, the utility of the MSCA for the assessment of mentally retarded children is in question if Indexes can not be reliably established for either the General Cognitive Scale or the other five Scales and some obtained Indexes are so low as to be uninterpretable.

One possible solution to the problem of tabling and interpreting MSCA Indexes for mentally retarded children is the use of mental ages (MAs). A table of MAs is provided in the MSCA manual for the General Cognitive Scale. McCarthy (1972) provided the table in recognition of the fact that MAs can be useful when describing the test performance of children to parents and teachers. However, these MAs were computed by the formula MA = GCI x CA/100 and therefore can only be established for children for whom it is possible to table a GCI. In the present study an alternate method of establishing MAs, based upon use of the MSCA standardization data, was employed. This technique allows for the establishment of MAs in the General Cognitive Scale and in all other Scales and requires only that the child's MA, not chronological age, fall within the range of 2½ to 8½ years. The use of these MAs is especially appropriate for older moderately mentally retarded children whose scores on the MSCA would be expected to fall below 3 standard deviations from the mean (and thus preclude tabling of the GCI and Scale Indexes with the MSCA normative tables) but whose MAs would make use of the MSCA appropriate. As Kaufman and Kaufman (1977) have noted, since the MSCA goes down to age 2½, there is an adequate floor to test older moderately mentally retarded children (5 and above).

The validity and utility of MSCA MAs when used to estimate the abilities of a sample of moderately mentally retarded children was investigated in the present study. Two criterion measures were selected to correlate with MAs derived from the MSCA: MAs from the Stanford-Binet (Form L-M, 1972) and developmental ages (DAs) as derived from a mother-completed developmental assessment instrument, the Minnesota Child Development Inventory (MCDI), (Ireton, 1974).

Method

Subjects

The subjects were 21 moderately mentally retarded children selected from the primary classes of two public schools for retarded children in Northeastern Ohio.

They were selected according to the investigators' criterion that they fall within the moderate range of mental retardation as determined by previous standardized intelligence testing. Specifically, their IQs were to fall within the 36 to 51 range and their MAs within the 3 to 8 year range. There were 13 males and eight females. Two of the children were black and 19 were white. The children ranged in age from 6.50 years to 11.58 years with a mean age of 8.56 years.

Instruments

McCarthy Scales of Children's Abilities. The MSCA consists of six Scales, each of which yields a composite raw score which is converted to a scaled score according to the chronological age of the child (McCarthy, 1972). For the present study, tables of MAs were constructed such that any composite raw score from any Scale could be entered and an MA score derived, provided the child's level of intellectual and motor functioning was within the 2½ to 8½ year range. The normative tables in the MSCA manual provided the data for establishing these MA tables. At each age level in the normative tables the composite raw score for each of the six Scales which fell at the Scale's mean (GCI = 100, Scale Indexes = 50) was determined. This raw score was then established as corresponding to a General Cognitive or Scale MA of 2½, 2 3/4, 3, 3¼, 3½, etc. Composite raw scores which did not fall exactly at the mean of a given Scale were established as corresponding to the age from which they deviated the smallest amount from the mean. There was no variation in this technique of determining MAs at any age level. However, children in the standardization sample below the age of 5 years were not administered the Right-Left Orientation test of the Perceptual-Performance Scale. This method of establishing MAs for the MSCA is the same as one described by Kaufman and Kaufman (1977). However, in the present study, MAs were established at quarter year intervals, whereas Kaufman and Kaufman established MAs only at half year intervals. The principle underlying the MAs as derived for this study, and those derived by Kaufman and Kaufman, is that the mean composite raw score obtained by children in the standardization sample of a given age, in a given Scale, reflects the typical performance of children of this age (Kaufman and Kaufman, 1977). Composite raw scores and their MA equivalents for each of the six Scales of the MSCA are provided in Table 1.

Insert Table 1 about here

Minnesota Child Development Inventory. The MCDI is a standardized test of 320 items designed to assess the development of children in the first 6½ years of life based upon a mother's observations (Ireton, 1974). From her description of the child, DA estimates are derived in eight areas: General Development, Gross Motor, Fine Motor, Expressive Language, Comprehension-Conceptual, Situation Comprehension, Self Help, and Personal-Social. In the present study, DAs from the General Development Scale of the MCDI were chosen to compare with MSCA and Stanford-Binet MAs. It is the most age-discriminating Scale and provides an overall index of development (Ireton, 1974).

Stanford-Binet Intelligence Scale. The Stanford-Binet (Terman & Merrill, 1973) is a professionally administered individual test of intelligence. It yields a global measure of intellectual functioning, the IQ, which is a standard score with a mean of 100 and a standard deviation of 16. In addition, the Stanford-Binet provides MA scores which were the scores of main interest in this study.

Procedure

For each child an MCDI was completed by the child's mother and an educational caregiver. Educational caregivers were 10 teachers and 11 teacher's aides. Educational caregiver-completed MCDIs served as reliability checks for mother-completed MCDIs. In some instances an educational caregiver filled out an MCDI on more than one child, however, no educational caregiver completed more than two MCDIs. The mean length of time that the educational caregivers had been instructing the child (children) for whom they completed an MCDI (s) was 8.24 months. In all cases but one the mother had been caring for her child since birth. In most cases MCDIs were completed approximately two weeks prior to the first professional assessment (mean = 11 days). The mean amount of time between mother's and educational caregiver's completion of the MCDI was 3 days, with a range of 0 to 14 days.

The Stanford-Binet and the MSCA were administered in the school setting by four trained examiners who were supervised by a licensed clinical psychologist. Both tests were administered according to the standardization procedures set forth in their respective manuals. For the MSCA this included administering the Right-Left Orientation test to all of the children in the sample because they were all older than 5 years. The order of administration of the Stanford-Binet and the MSCA was counterbalanced such that 11 children were administered the Stanford-Binet first and 10 children were administered the MSCA first. The mean interval of time that elapsed between the two professional assessments was 8 days, with a range of one to 21 days.

Results

DA estimates derived from the General Development

Scale of mother and educational caregiver MCDIs correlated highly ($r = .86$, $p < .001$) indicating good interjudge reliability between mothers and educational caregivers. The mean mother General Development DA of 45.10 months (standard deviation = 13.14) was significantly higher than the mean educational caregiver General Development DA of 41.10 months (standard deviation = 11.91), (t (20) = 2.68, $p < .014$).

The Pearson product-moment correlations of the Stanford-Binet MAs and the mother MCDI General Development DAs with the MSCA General Cognitive MAs were .75 and .77, respectively. The Stanford-Binet MAs and the mother MCDI General Development DAs correlated .67. These correlation coefficients were all significant ($p < .001$) and did not differ significantly from one another. MSCA Motor, Verbal, Perceptual-Performance, Memory, and Quantitative MA correlations with the Stanford-Binet MAs and the mother MCDI General Development DAs ranged from .61 to .74. All of these correlation coefficients were significant ($p < .002$).

Insert Table 2 about here

Table 2 contains the means and standard deviations of all the test Scale scores. A 1 x 3 analysis of variance for repeated measures performed on the MSCA General

Cognitive MAs, the Stanford-Binet MAs, and the mother MCDI General Development DAs yielded an F (2,40) = 2.33, which was not significant. Thus, not only were the MAs and DAs from all three tests highly correlated but their means did not differ from each other in this sample of moderately retarded children.

Although the focus of this investigation was on the use of MSCA MAs, as derived by the technique described, 11 children in the sample were 8½ years or younger and it was therefore possible to attempt to table GCIs for these 11 and then compare their GCIs to their obtained IQs. For 10 of the 11 children GCIs could not be tabled and they could only be assigned GCIs of less than 28 according to Naglieri and Harrison (1978). For this subsample of children, 8½ years or younger, IQs ranged from 31 to 65, with a mean of 50.46 (standard deviation = 9.09). For nine children IQs were more than 17 points higher than GCIs.

Discussion

The results of the present investigation suggest the MSCA can yield valid information about the abilities of mentally retarded children even when GCIs and Scale Indexes can not be computed. The MSCA General Cognitive and five specific Scale MAs correlated significantly and highly with both Stanford-Binet MAs and mother MCDI General Development DAs. The finding of no significant differences among correlations and mean scores of the MSCA General Cognitive Scale, the Stanford-Binet, and the mother MCDI General Development Scale indicates the three measures yield similar estimates of ability level when their scores are expressed as MAs.

Although there was good interjudge reliability between mothers and teachers on the General Development Scale of the MCDI, the mean DA from the mothers' reports was significantly higher than the mean DA from the educational caregivers' reports. This higher DA estimation by mothers replicates findings reported by other investigators (Gradel, 1979; Stancin, 1981; Thompson, 1979).

Despite the positive findings of this study on the use of the MSCA to assess the intellectual functioning of moderately retarded children, the utility of MA estimates has been questioned. Kaufman and Kaufman (1977) have cautioned, "...age norms are far less efficient psychometrically than standard score norms .... consequently, a Scale Age [MSCA MA] profile can not substitute for a Scale Index profile without a loss of precision" (p. 124). The use of MAs is suggested as a means of deriving information about mentally retarded children from an instrument that should be useful and appropriate for such a population. However, due to norming procedures which included the deletion of exceptional children from the standardization sample and extension of Scale Indexes only plus or minus 3 standard deviations from the mean, the MSCA appears to be able to yield little information about some mildly retarded children and most moderately retarded children in the form of standard scores. The main benefit of MSCA MAs, as derived in this study, is seen as their use in conjunction with scores from other assessment instruments. In addition, MAs are easily interpretable and easily understood by parents and teachers. Kaufman and Kaufman (1977) have pointed out that, "the age equivalent technique has the advantage of being universally understood .... Scale Ages [MAs] will often help highlight the level of a child's significant strengths and weaknesses when other approaches do not communicate" (p. 122-123).

The GCI-IQ discrepancy found for the subsample of children 8½ years or younger is similar to GCI-IQ discrepancies reported by other investigators (Harrison et al., 1980; Levenson & Zino, 1979; Naglieri & Harrison, 1979). Harrison et al. (1980) and Naglieri and Harrison (1979) have suggested that a low GCI may not indicate as severe a degree of mental retardation as a low IQ. The MSCA appears to grossly underestimate the intellectual level of some mentally retarded children when MSCA Indexes or extrapolated Indexes are used. At the present time, only MSCA MAs can be recommended for describing the ability levels of mentally retarded children. Future investigations should attempt to determine the performance of large numbers of mentally retarded children on the MSCA at each age level so that GCIs and Scale Indexes with an empirical basis can be established for this population. In this way full advantage could be taken of the MSCA and there would not have to be reliance on extrapolated scores or MAs when the child to be assessed is mentally retarded.

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Footnotes

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Requests for reprints should be sent to Jeanette Reuter, Ph.D., Department of Psychology, Kent State University, Kent, Ohio, 44242.

Table 1

MA Equivalents in Months of MSCA Composite Raw Scores

	Raw scores					
MAs	General Cognitive	Verbal	Perceptual-Performance	Quantitative	Memory	Motor
30	19-28	10-14	5-8	3-4	4-6	7-9
33	29-41	15-20	9-13	5-7	7-9	10-12
36	42-49	21-26	14-15	8-9	10-11	13-15
39	50-57	27-29	16-17	10	12-13	16-17
42	58-67	30-34	18-20	11-12	14-16	18-21
45	68-81	35-41	21-25	13	17-20	22-24
48	82-91	42-46	26-28	14-16	21-23	25-28
51	92-100	47-49	29-31	17	24-25	29-31
54	101-109	50-53	32-35	18	26-27	32-34
57	110-120	54-57	36-42	19-20	28-29	35-37
60	121-129	58-59	43-48	21-22	30-31	38-39
63	130-138	60-63	49-51	23	32-33	40-42
66	139-145	64-66	52-53	24-26	34-35	43-44
69	146-152	67-68	54-56	27-29	36-38	45-46
72	153-160	69-70	57-58	30-31	39	47-48
75	161-166	71-73	59-61	32	40-41	49-50
78	167-172	74-76	62-63	33-34	42	51-53
81	173-178	77	64-65	35	43	54-55
84	179-184	78-79	66-67	36-37	44	56
87	185-192	80-81	68-70	38-39	45	57-59
90	193-198	82-83	71	40	46-47	60-61
93	199-203	84-86	72-73	41	48	62
96	204-207	87	74	42-43	49	63

Table 1 continued

99	208-210	88-89	75-76	44	50	64
102	211-218	90-92	77-79	45-46	51-52	65-66

Note. Locate the child's composite raw score under the appropriate Scale. Move horizontally across to the far left column to determine the MA equivalent.

Table 2

MSCA, Stanford-Binet, and MCDI: Means and Standard Deviations in Months

	M	SD
MSCA MAs		
General Cognitive	42.86	6.65
Verbal	39.71	5.27
Perceptual-Performance	46.71	8.83
Quantitative	41.71	8.53
Memory	41.43	6.62
Motor	43.86	11.75
Stanford-Binet MAs	47.33	8.27
MCDI[a] DAs	45.10	13.14

[a] MCDI = General Development Scale as completed by mothers

Summary of Consultant and Caregiver Evaluations of the *Minnesota Child Development Inventory*.

Christine A. Gidycz

Summary of the Field Consultants' Evaluations for the MCDI (101 Evaluations)

I Question 1.- Did the MCDI results on this child give you enough information to make out the report?

response	N	%
yes	83	82%
no	15	15%
blank	1	1%
other	2	2%

A) Reasons given for the MCDI not providing enough information for the consultants to write their reports.

1) Caregivers did not understand directions for completing the scale (listed on 1 evaluation).

2) The child ceilinged out on the scale (listed on 2 evaluations).

3) The MCDI did not detect certain handicaps or behaviors that were unique to a specific child. The following is a list of undetected behaviors or handicaps:

a) hyperactivity
b) short attention span
c) non verbal communication
d) cerebral palsy
e) specific health problems (i.e., heart problems)
f) echolalia

B) Problems encountered by consultants who made use of the MCDI to write their reports:

1) The amount of scatter found on the scales made it difficult to write the report (reported on 2 evaluations).

2) Exclusive reliance on the MCDI did not provide enough information to write the report so additional measures were also used (i.e., The Stanford-Binet and the MSCA) (listed on 4 evaluations).

3) It was difficult to write the report since specific handicaps were undetected by the scale (ie. blindness and motor problems) (listed on 2 evaluations).

II Question 2 - Did the caregivers have difficulty cooperating? If so, why?

Response	N	%
yes	13	13%
no	86	85%
blank	1	1%
other	1	1%

A) Reasons given by consultants for a "yes" response.

1) A Mother objected to the wording of questions (listed on 1 evaluation).

2) Mothers had difficulty in reading the items (i.e., illiterate or language barrier) (listed on 2 evaluations).

3) Mother ill so did not complete the MCDI (listed on 1 evaluation).

4) Mother unrealistic in appraisal of child's abilities (listed on 1 evaluation).

5) Discrepancies between two caregivers' reports on the MCDI (listed on 3 evaluations).

5) Caregiver either tardy in completing the scale or did not complete the scale at all (listed on 2 evaluations).

III Question 3 - Will this proposed report and/or the MCDI print out results directly affect planning for this child?

response	N	%
yes	98	97%
no	3	3%

How?

a) help caregiver to care for the child better (listed on 26 evaluations)

b) used in staffing at school or residence (listed on 67 evaluations)

c) included in child's record in school, residence, or doctor's files (listed on 96 evaluations)

d) other (listed on 1 evaluations)

--used to help the family to realistically appraise and work with the child

IV Question 4 - To whom were the results of the MCDI and the report made available?

response	N
Parent	74
Teacher	93
Administrator	42
Other	13
-School	2
-School Psychologist	11

Summary of Caregiver Evaluations of the MCDI

The total number of caregiver evaluations completed was 196. If all caregivers had completed an evaluation there would have been 200. Caregivers were asked to respond to four questions pertaining to their experience with the MCDI. The following is a question by question summary of their responses.

Question 1 About how long did it take you to complete an MCDI?

time	N	%
0 min.	0	0
30 min.	41	21%
45 min.	86	44%
more than an hour	64	33%
blank	5	3%

Question 2 Do you recall any items which were difficult to answer? What were they?

response	N	%
yes	93	48%
no	50	26%
blank	49	25%

For the 93 caregivers who answered yes to this question it was possible to classify their reasons given for difficulty with particular items into three general categories. These categories are presented below.

1 Items most frequently cited as being difficult to answer were those concerning home related activities. Specifically, teachers cited items that dealt with self-help skills and autonomous behav-

ior in the home and neighborhood as being difficult to respond to simply because they had no opportunity to observe this kind of behavior. Some teachers indicated that they guessed about these kinds of items, while others indicated that they marked no to any item for which they had not had the opportunity to observe the stated behavior, even when they thought the child probably did perform the behavior. Some caregivers also remarked that they felt uncertain about how to respond to items that dealt with a stage of development that their child or pupil had outgrown. It was not clear to them that they should respond affirmatively to items concerning behaviors not currently displayed by their child because the behaviors had been outgrown. Approximately 36 caregivers marked yes to question 2 because of insufficient knowledge to answer questions about a child's home activities. Approximately eight caregivers responded yes to question 2 because of uncertainty over how to respond to those items concerning behaviors that had been outgrown.

2 The next most frequently cited reason for having difficulty responding to particular items on the MCDI was that some inconsistency on the part of the child in performing the behavior or the manner in which the behavior was performed made responding with a definite yes or no hard. Specifically, when a behavior was situation specific or seen only sporadically, when a behavior was performed with assistance or only with prompting, and when only some component or an approximation of the behavior was performed, caregivers reported being uncertain of how to respond. Approximately 28 responses to question 2 fell within this category.

3 Several caregivers reported that items pertaining to expressive language abilities were difficult to respond to because their child or pupil was largely nonverbal but could be credited with performing the behavior if nonverbal means of communication were considered. However, they did not know whether it was permissible to pass a child on an expressive language item when the child did not actually verbalize. Caregivers wrote that their nonverbal children made inquiries and conveyed knowledge and understanding through gestures, sign language, and language boards. Approximately 14 responses to question 2 fell within this category.

In addition to the responses which could be placed in one of the above three categories, there were some miscellaneous responses to question 2 such as, "items were not clear", "some questions were culturally biased", and "did not understand some of the item words". There were approximately six miscellanious responses to question 2.

There were also some caregivers who answered yes to question 2 but cited no specifics and caregivers who listed specific item numbers but did not detail why the items were hard to answer. No one specific item was listed more than three times as being difficult to answer. There were about nine caregivers who listed only item numbers or responded yes to question 2 but provided no elaboration.

Question 3 Were there some things that this child you care for could do that were not on the test?

response	N	%
yes	74	38%
no	79	40%
blank	41	21%

Skills and abilities of their children that caregivers found not represented on the MCDI:

1 Nonverbal means of communication, including the use of sign language and written language to express knowledge and understanding, were most frequently cited by caregivers as abilities of their children not represented on the MCDI. Specific examples cited by caregivers included: identification of classmates by written names, labeling of objects by use of a language board, and ability to sign several symbols. Approximately 20 caregivers listed nonverbal means of communication as abilities of their child not on the MCDI.

2 Certain athletic activities such as swimming, roller skating, bowling, and participation in team sports were listed as activities which some children were capable of but which were not on the MCDI. In some cases caregivers listed activities which were in fact covered by the MCDI. About 15 caregivers listed physical abilities in response to question 3.

3 About 16 caregivers listed self-help skills and helping abilities as things their child could do which were not on the MCDI. Examples included: prepares own food and drink, cares for own belongings (toys, clothes), and assists with household chores such as the cooking,dishwashing, and dusting. Again, some listed abilities were covered by the MCDI.

4 About 15 caregivers listed behaviors that demonstrated independence, responsibility, and social awareness as behaviors their child displayed but which were not on the MCDI. Examples included: travels within the school unattended, assumes responsibility for younger siblings, leads class in assignments, goes to

the store alone, and disciplines self. Some of the listed behaviors were covered by the MCDI.

5 Approximately 15 caregivers listed a cognitive ability as something their child could do which was not on the MCDI. However, most of these listed cognitive abilities were covered by the MCDI. The few abilities listed, not covered by the MCDI included: ability to tell time, complete complex puzzles, classify objects, and tell stories from pictures.

Question 4 Which of the following words best describes your experience with the MCDI? a) frustrating b) helpful for my child c) hard to do d) interesting

some caregivers circled two or more responses

response	N	%
frustrating	26	13%
helpful	31	16%
hard	6	3%
interesting	142	73%
blank	1	.5%

Dissemination Activities.

Lectures and Presentations by the First Chance Project Staff

Reuter, J. *The measurement of human development: A case history*. College of Arts and Science Faculty Lecture Series, Kent State University, November 1980.

Reuter, J., Stancin, T., Moe, J., Clow, C., Gidycz, C., & de Vries, B. *Research on the use of caregiver information for assessing developmentally delayed young children*. Inservice presentaion at the Blick Clinic for Developmental Disabilities, Akron, Ohio, December 1981.

Reuter, J. *The assessment of infants and handicapped young children*. Department of Psychology, Kent State University, December 1981.

Reuter, J. *The development of infants and severely handicapped young children*. Department of Home Economics, Kent State University, April 1982.

Reuter, J. *The Kent Infant Development Scale: Assessing infants and severely handicapped young children*. Department of Psychology, Youngstown State University, May 1982.

Stancin, T. *Use of the KID Scale for assessing infants and handicapped young children*. Department of Special Education, Kent State University, April 1982.

PROFESSIONAL ACTIVITES

Dunn, V., Stancin, T., & Reuter, J. The adaptation of an infant behavior measure for severely handicapped children. Paper presented at the meeting of the Midwestern Psychological Association, Detroit, May 1981.

Reuter, J. & Dunn, V. Reliability and validity of the KID Scale for severely handicapped children. Paper presented at the meeting of the Association for the Severely Handicapped, Los Angeles, October 1980.

Stancin, T., Reuter, J., & Bickett, L. The validity of caregiver-based information for the assessment of severely handicapped young children. Paper presented at the meeting of the Midwestern Psychological Association, Minneapolis, May 1982.

SCHEDULED PRESENTATION

Reuter, J., Dunn, V., Stancin, T., & Moe, J. Caregiver reports for the assessment of severely handicapped young children: Reliability, validity and utility. Panel presentation at the meeting of the Association for the Severely Handicapped, Denver, November 1982.